

### TRANSPORTATION CABINET

Ernie Fletcher Governor Frankfort, Kentucky 40622 www.kentucky.gov

Bill Nighbert Secretary

Marc Williams
Commissioner of Highways

May 16, 2007

Division of Water Water Quality Certification Section ATTN: Jenni Garland 14 Reilly Road Frankfort, KY 40601

SUBJECT:

Section 401 – Water Quality Certification

Breathitt County Item No. 10-0270.60/.70

**KY-15 Relocation** 

MAY 1 7 2007

WATER QUALITY
CERTIFICATION SECTION

RECEIVED

Dear Ms. Garland:

We recently submitted a Section 404 Permit application to the Louisville District Corps of Engineers for the above subject project. This letter is intended to make you aware of the project and the impacts associated and to request a Water Quality Certification. This project is located in Breathitt County, Kentucky and is approximately 2.1 miles in length. The purpose of the project is to reconstruct KY-15 from Jackson to Still House Hollow. This project impacts waters of the United States and will require a permit from the Army Corps of Engineers as well as a Water Quality Certification from the KY Division Water.

At the present time, the scheduled letting date for this project is March 14, 2008. All approvals must accompany the Notice to Contractors, typically distributed two months in advance, going out on January 11, 2008. Your assistance toward meeting this date is greatly appreciated.

Enclosed are drawings, a summary sheet of impacts, location map, plan sheets, mitigation discussion, and habitat assessments. If you have any questions or need additional information, please contact me at (502) 564-7250.

Sincerely,

Ronald B. Rigney, II Permits Coordinator

Permits Coordinator

Division of Environmental Analysis

Ronald B. Rigney I



## COMMONWEALTH OF KENTUCKY NATURAL RESOURCES & ENVIRONMENTAL PROTECTION CABINET DEPARTMENT FOR ENVIRONMENTAL PROTECTION DIVISION OF WATER

### APPLICATION FOR PERMIT TO CONSTRUCT ACROSS OR ALONG A STREAM AND / OR WATER QUALITY CERTIFICATION

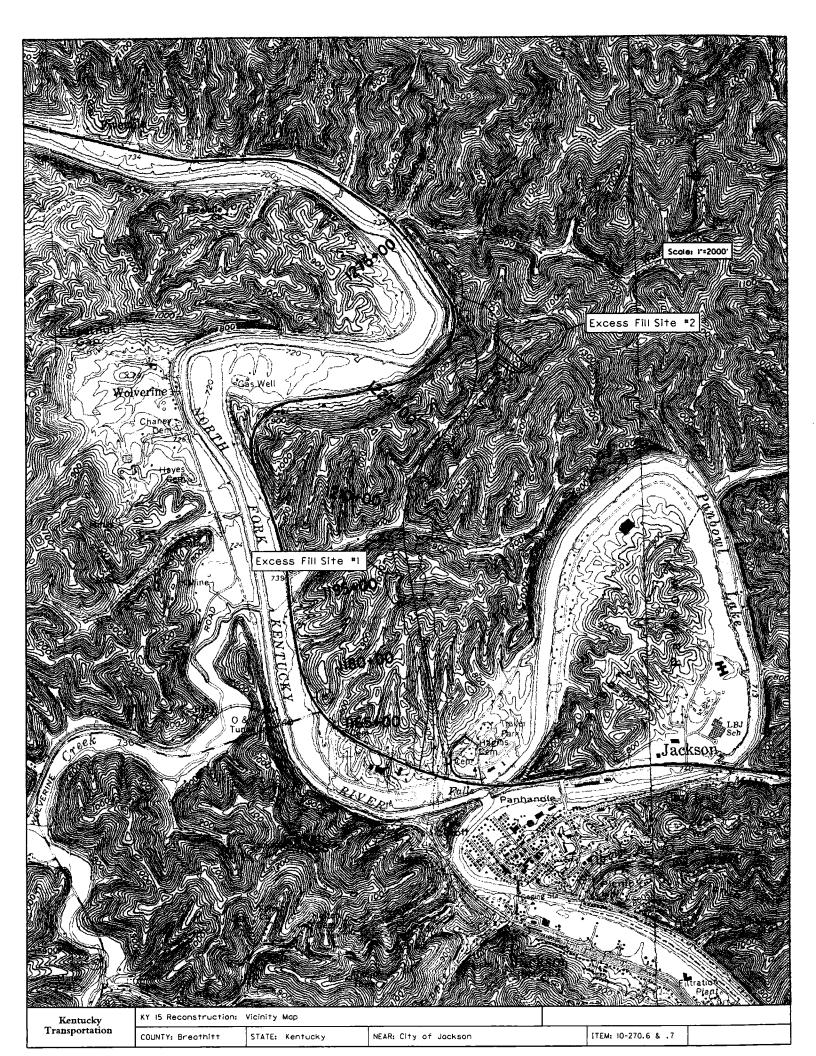
Chapter 151 of the Kentucky Revised Statutes requires approval from the Division of Water prior to any construction or other activity in or along a stream that could in any way obstruct flood flows or adversely impact water quality. If the project involves work in a stream, such as bank stabilization, dredging or relocation, you will also need to obtain a 401 Water Quality Certification (WQC) from the Division of Water. This completed form will be forwarded to the Water Quality Branch for WQC processing. The project may not start until all necessary approvals are received from the KDOW. For questions concerning the WQC process, contact John Dovak at 502/564-3410.

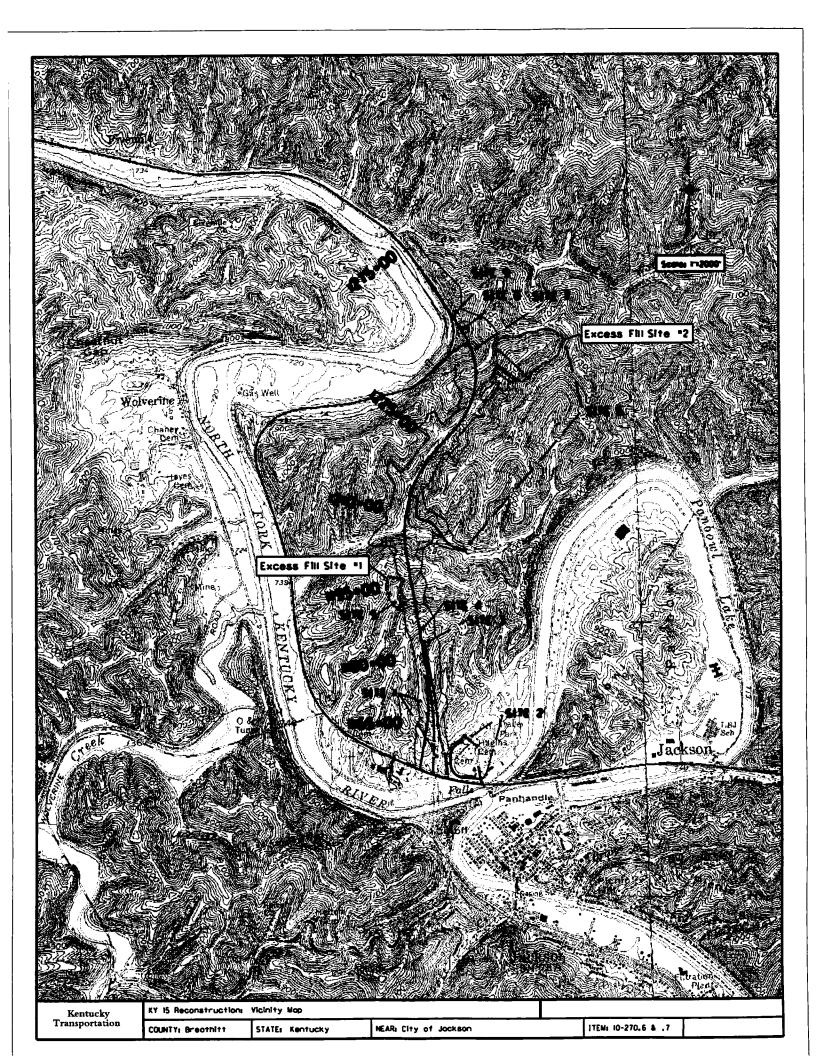
If the project will disturb more than 1 acre of soil, you will also need to complete the attached Notice of Intent for Storm Water Discharges, and return both forms to the Floodplain management Section of the KDOW. This general permit will require you to create and implement an erosion control plan for the project.

1.	OWNER: Kentucky Transportation Cabinet		
	Give name of person(s), comp	oany, governmental unit, or other owner of p	roposed project.
	MAILING ADDRESS: 200 Mero Street, 6 <sup>th</sup> Floor,	Frankfort, KY 40622	
	TELEPHONE #: 502-564-3130	EMAIL:	
2.	AGENT: Ronald Rigney, II - Permits Coordinator	Division of Environmental Analysis	
	Give name of	person(s) submitting application, if other the	an owner.
	ADDRESS: 200 Mero Street, 5 <sup>th</sup> Floor, Frankfort, I	XY 40622	
	TELEPHONE #: 502-564-7250	EMAIL: RonB.RigneyH@ky.gov	
3.	ENGINEER:	P. E. NUMBER	RECEIVED
	Contact Division of Water if waiver can be gra	inted	MAY 1 7 2007
	TELEPHONE #:	EMAIL:	
4.	DESCRIPTION OF CONSTRUCTION:		WATER QUALITY CERTIFICATION SECTIO
7.		the type and purpose of construction an	
	This project concerns the construction of two sections	s (2.4 miles) of the KY15 reconstruction proid	ect. This is on new align-
	ment, requiring the placement of several new culverts	s. relocation of streams, and the develonment	of two excess fill sites.
	No wetlands are impacted. Mitigation for the stream	imnacts will he hy navment of an in-lieu fee	due to limited opportunities
	on-site.		
5.	COUNTY: Breathitt NE	CAREST COMMUNITY: Jackson	MANAGEMENT - 1
6.	USGS QUAD NAME: Jackson	LATITUDE/LONGITUDE: N37-34-2	20,W83-23-32 (Shacks Br.)
7.	STREAM NAME: Shacks Br. & N.F. of KY River	WATERSHED SIZE (in acres): 423.4	(Site 6, having the largest)
8.	LINEAR FEET OF STREAM IMPACTED: See tal	bles for impacts requiring mitigation.	
9.	DIRECTIONS TO SITE: From Lexington on I-64,	take the Bert Combs Mountain Parkway to	Campton. Take KY15 at
	Campton, heading southeast to the City of Jackson. T	he nroiect begins with an interchange near th	ne N.F. Kentucky River
	"cutoff" that forms Panhowl Lake. From this point, t	he road will head north overland on a new al	ignment, crossing Shacks
	Branch. It continues north and then west to reioin exis	sting KY15 where construction of a previous	ly nermitted section is
	underway.		

	TION OF THE REQUESTED PROJECT NOW CON	- · · · · · · · · · · · · · · · · · · ·
ESTIMATE	D BEGIN CONSTRUCTION DATE:	Fall of 2007
ESTIMATE	D END CONSTRUCTION DATE:	Three years from start (2010)
HAS A PERI	MIT BEEN RECEIVED FROM THE US ARM permit. Application has been mailed to COE.	Y CORPS OF ENGINEERS? Yes No If yes, attach
THE APPLI	CANT MUST ADDRESS PUBLIC NOTICE	
(a)	Public notice in newspaper having greatest cir	culation in area (provide newspaper clipping or affadavit)
	Adjacent property owner(s) affadavits (Conta	ct Division of Water for requirements.)
(b) <u>~</u>	I REQUEST WAVER OF PUBLIC NOTICE KYTC projects are exempt.	
I HAVE CO		on of Water for Requirements. UNTY OFFICIALS CONCERNING THIS PROJECT:
Give	name and title of person(s) contacted and provide	le copy of any approval city or county may have issued.
	THIS PROJECT WILL BE LOCATED OF dams, this includes the area that would be imposed.	WNS OR HAS EASEMENT RIGHTS ON ALL PROPERTY R ON WHICH RELATED CONSTRUCTION WILL ounded during the design flood). en submitted to the Louisville District Corps of Engineers.
	SIGNATURE:  Owner or Agent sign here  DATE:  SIGNATURE OF LOCAL FLOODPLA  Permit application will be returned to	along a stream as described in this application and any the information provided is true and correct.  (If signed by Agent, a Power of Attorney should be attached.)  IN COORDINATOR: N/A (exempt by regulation) applicant endorsed by the local floodplain coordinator.
	DATE:	<del></del>
	SUBMIT APPLICATION AND ATTAC	HMENTS TO:

Floodplain Management Section Division of Water 14 Reilly Road Frankfort, KY 40601





### Purpose and Need

The "Statewide Transportation Plan (FY1995-2014)" identified KY15 from KY28 to Campton as needing improvement to meet the strategic goals of the plan. KY15 has been designated for inclusion on the National Highway System (NHS), being identified as an important corridor both locally and regionally.

The existing roadway has 2 lanes except for short segments within the Jackson city boundaries where 4 lanes are utilized; and has a horizontal alignment that follows the meanders of the river and larger creeks. This has resulted in numerous curves and greatly reduced passing opportunities. These deficiencies, combined with congestion due to the densely-spaced entrances for businesses and subdivisions, as well as the high traffic volumes, have resulted in numerous accidents and fatalities. This project is a portion of the overall plan to reconstruct KY15 (widen and realign) to eliminate those safety concerns as well as upgrade the Level of Service of the road. The project will allow for through traffic bypassing the downtown of the city of Jackson, reducing the congestion and "bottlenecking" that presently exists there. Accessibility for police and fire projection will also be improved. This project will join a section of KY15 currently under a reconstruction.

### ATTACHMENT Block 24

### **Adjoining Property Owners**

City of Jackson c/o Michael Miller, Mayor 333 Broadway Street Jackson, KY 41339

Thomas Investments, Inc. c/o Logan Thomas P.O. Box W Beattyville, KY 41311

Roscoe & Louise Terry 520 Hwy 15 N Jackson, KY 41339

Thomas & Carol Miller P.O. Box 952 Jackson, KY 41339

William Back 959 Highland Avenue Jackson, KY 41339

LBG Holdings, LLC c/o Helton Branham P.O. Box 3130 Frankfort, KY 40602

Roy & Louise Terry 825 Issac Shelby Circle E Frankfort, KY 40601

Gene & Myrtle Watts Watts Funeral Home P.O. Box 945 Jackson, KY 41339

Juanita Callahan P.O. Box 106 Jackson, KY 41339 Ed Herald c/o Ted Edmonds 1257 Beattyville Road Jackson, KY 41339

Diocese of Covington Holy Cross Church 1140 Madison Ave., Box 192 Covington, KY 41011

Christopher & Courtney Neace 1935 Lick Branch Armory Road Jackson, KY 41339

Rose Ventures, LTD. P.O. Box 943 Jackson, KY 41339

Farm Bureau Insurance P.O. Box 1210 Jackson, KY 41339

Jackson Enterprise, Inc. 19 Brewer Drive Jackson, KY 41339

Jefferson Gas Transmission Co., Inc. P.O. Box 24032 Lexington, KY 40524-4032

Mary Louise Calhoun P.O. Box 423 Jackson, KY 41339

Michael & Stephanie Watkins 2594 Quicksand Road Jackson, KY 41339 ATTACHMENT Block 24 (cont.)

Dorothy Make Trust 126 Burgess Avenue Dayton, OH 45415-2604

Ethel Back c/o Sharon Jewell 722 Joycie Lane Waynesville, OH 45068

Raymond Back 2345 N Main Street Dayton, OH 45405

Jayne Risner 7267 Meeker Creek Drive Jackson, KY 41339

Brian & Melissa Banks 764 Shacks Branch Road Jackson, KY 41339 William Back 665 Hwy 15 North Jackson, KY 41339

JP & Barbara Deaton 329 Shacks Branch Road Jackson, KY 41339

William Hurst 4074 KY 205 Campton, KY 41301

Jeffrey Howell P.O. Box 19 Jackson, KY 41339

Wayne & Sherri Simpson 710 Shacks Branch Road Jackson, KY 41339

### **SUMMARY OF IMPACTS**

Item No. 10-270.60 & .70

(Stations are along the mainline unless otherwise noted)
The North Fork Kentucky River will be referred to as North Fork in the descriptions.

- 1. Right Sta. 1149+00 to Left Sta. 1170+00 <u>Upstream to downstream</u>: construct 403' of inlet channel, merging with a 535' pipe culvert (Sta. 1167+53.7) with 130' of inlet channel, at the inlet of a 804' pipe culvert (Sta. 1161+79.4). From the culvert outlet construct 486' of outlet/inlet channel to a 553' pipe culvert (KY15, Sta. 36+05) with 32' of outlet channel improvement; on **intermittent/perennial** tributaries to North Fork. This replaces **1580'** of **perennial** (Reaches 3C, 3D) and **98'** of **ephemeral** (EPH.#1) channel on one tributary, and **391'** of **perennial** (Reach 3B), **225'** of **intermittent** (Reach 3A) and **150'** of **ephemeral** (EPH.#2) channel on the other; as well as 638' of existing pipe culvert to the river. The total impact to waters is **0.13** acres (**0.11** acres of perennial, **0.01** acres of intermittent, and **0.01** acres of **ephemeral**). The drainage area affected is **73.0** acres. The site is located at N37-33-32, W83-23-25. (Individual Permit, WQC)
- 2. Panbowl Rd. Sta. 28+40 to Sta. 44+50 <u>Upstream to downstream</u>: Drain and fill an existing **0.67 acre pond**, and construct 89' of pipe culvert (Brewers Dr., Sta. 20+61.30); on an **intermittent** tributary (Reach 2). It discharges into 115' of undisturbed channel; then into 847' of new inlet channel for a 594' pipe culvert (Panbowl Rd., Sta. 27+77.6 to Sta. 33+00), with 75' of outlet channel to Panbowl Lake. This replaces **57'** of channel (and 32' of existing culvert) at Brewers Drive, **427' of assumed length** through pond, **40'** of pond outlet channel; leading to 784' of existing storm sewer that outlets into the North Fork. The impact to waters is **0.04 acres**. The drainage area affected is **23.7 acres**. The site is located at N37-33-32, W83-23-20. (Individual Permit, WQC)
- 3. Sta. 1181+75 Fill 333' of ephemeral tributary to North Fork. The impact to waters is 0.03 acres. The drainage area affected is 6.3 acres. The site is located at N37-33-56, W83-23-27. (Nationwide Permit No. 14)
- 4. Sta. 1185+35 Fill 455' of ephemeral (EPH.#1 & 2) tributaries to North Fork. The impact to waters is 0.04 acres. The drainage area affected is 5.9 acres. The site is located at N37-34-00, W83-23-28. (Nationwide Permit No. 14)
- 5. Sta. 1191+00 to Sta. 1198+50 Construct 401' of pipe culvert (Sta. 1191+11.4), with 15' of outlet channel improvement, and develop Excess Fill Site #1; on **ephemeral** tributaries to North Fork. The culvert replaces **437'** of existing channel (EPH.#1). Fill Site #1 (and roadway fill) replaces **1008'** (EPH.#2) and **343'** (EPH.#3) of existing channel. The total impact to waters is **0.26 acres** (0.06, 0.16, and 0.04, respectively). The drainage area affected is **41.9 acres**. The site is located at N37-34-05, W83-23-28 acres. (Individual Permit)

6. Sta. 1203+00 to Right Sta. 1239+00 – <u>Upstream to downstream</u> (starting below Excess Fill Site #2): construct 383' of drainage channel to 260' of pipe culvert (Sta. 1235+32), that outlets into 3428' of new stream channel (including 96' of entrance pipe at Left Sta. 1226+50). This is on a perennial tributary to Shacks Branch. This replaces 3469' of stream (Reach 8A, 8B & lower portion of 8C). The impact to waters is 0.34 acres of perennial. Other impacts associated with this site (upstream to downstream) are:

Left Sta. 1238+00 - Fill **184**' of **ephemeral** tributary (EPH.#14). The impact to waters is **0.01 acres**.

Right Sta. 1235+50 – Fill 333' of ephemeral tributary (EPH.#13). The impact to waters is 0.02 acres.

Left Sta. 1228+50 – Fill and relocate **two ephemeral** tributaries (EPH.#11 & 12). This replaces **1372**' of existing channel. The impact to waters is **0.08 acres**.

Sta. 1227+50 – Fill, and construct 278' of pipe culvert with 159' of inlet channel, on **three ephemeral** tributaries (EPH.#8, 9 & 10). This replaces **1014'** of existing channel. The impact to waters is **0.03 acres**.

Sta. 1218+50 – Fill, and construct 339' of pipe culvert, on an **ephemeral** tributary (EPH.#7) This replaces **346'** of existing channel. The impact to waters is **0.02** acres.

Left Sta. 1216+70 – Fill and relocate **two ephemeral** tributaries (EPH.#5 & 6). This replaces **968**° of existing channel. The impact to waters is **0.09 acres**.

Left Sta. 1209+30 – Fill 439' of ephemeral tributary (EPH.#4). The impact to waters is 0.03 acres.

Right to Left of Sta. 1205+73 – Construct 380' of inlet channel to a 68' pipe culvert (Shacks Br. Sta. 47+66) with 10' of outlet channel, to an undisturbed portion of stream (435' in length); leading to 1153' of pipe culvert (Sta. 1205+73), with 100' of outlet channel improvement. This is on Shacks Branch, a perennial stream (Reach 7A, 7B & 7C). Additionally, construct 84' of pipe culvert (Shacks Br. Sta.41+72) in, and fill, an ephemeral tributary (EPH.#2); and fill two another ephemeral tributaries (EPH.#1 & 3). This replaces 1903' of perennial and 794' of ephemeral channel. The impact to waters is 0.23 acres of perennial and 0.08 acres of ephemeral.

The total impact to waters for the site is 0.93 acres (0.57 acres of perennial and 0.36 acres of ephemeral). The drainage area affected is 423.4 acres (measured at the most downstream point of impact on Shacks Branch). The site is located from N37-34-20, W83-23-32 to N37-34-46, W83-23-11. (Individual Permit, WQC)

- 7. Left Sta. 1239+00 to Left Sta. 1249+00 Develop Excess Fill Site #2. This replaces 649' of perennial (upper portion of Reach 8C), 1410' of intermittent (Reach 8D), and 1951' of ephemeral channel (EPH.#15 to #22). The impact to waters is 0.06 acres of perennial, 0.23 acres of intermittent, and 0.18 acres of ephemeral. The drainage area affected is 62.9 acres. The site (midpoint) is located at N37-34-54,W83-23-02. (Individual Permit, WQC)
- 8. Left Sta. 1247+50 to Left Sta. 1251+49 Construct 129' of pipe culvert (Appr. Rd., Sta. 29+70.00), with 323' of outlet channel, and a stormwater collection system upstream for the mainline road; on **ephemeral** tributaries to North Fork. The culvert collects inflow from the stormwater system as well as overland flow into a drop box inlet. This replaces a total of **1060**' of existing channel (566', 300' and 194', respectively). The impact to waters is **0.07 acres**. The drainage area affected is **12.3 acres**. The site is located at N37-34-57, W83-23-13. (Nationwide Permit No. 14)
- 9. Right Sta. 1253+20 to Right Sta. 1254+40 Fill three **ephemeral** channels due to roadway fill. This replaces a total of **546**° of existing channel (204°, 186° and 156°, respectively). The impact to waters is **0.03** acres. The drainage area affected is **6.0** acres. The site is located at N37-35-01, W83-23-15. (Nationwide Permit No. 14)
- 10. Sta. 1258+05 Construct 189' of pipe culvert, with 100' of inlet and 20' of outlet channel improvements; on an **intermittent** tributary (Reach 11) to North Fork. This replaces 249' of existing channel and 80' of existing culvert. The impact to waters is 0.03 acres. The drainage area affected is 12.7 acres. The site is located at N37-35-05, W83-23-16. (Nationwide Permit No. 14)

**NOTE**: Due to the length of some impacted streams, multiple assessments were performed. Those segments are identified by use of an "A, B, D, etc." after the reach number.

### Mitigation Discussion

### Breathitt Co., Item No. 10-270.6 & .7

This project will impact over two miles of stream that require mitigation. The impacts are due primarily to fill for the roadway embankment and the need for excess fill material sites.

Although the roadway alignment follows long reaches of existing streams, any shift to avoid the streams would result in a large increase in excavation; generating much more material to dispose of. Disposal would require other streams to be impacted, as well as significantly increase the cost of the project. Efforts have been made to minimize stream impacts by reducing the need for material disposal sites. Initial proposals involved five or more sites for these two sections of the reconstruction. This has been reduced to two sites, one of which impacts ephemeral streams. Where the roadway embankment was already impacting a stream, the cross section of the roadway was increased to account for some of the material, causing only slight increases in impacts to ephemeral tributaries. This allowed avoidance of potential impacts to other intermittent and/or perennial streams for disposal sites.

Most of the mitigation needs are for impacts to streams in two major areas, Sites 1 and 6. Mitigation on-site was not practical for various reasons. Site 1 involves long culverts with limited open channel available. The main channel in this area has already been placed in a long culvert before reaching the river. At Site 6, the major impact area for this project, there will be a long open channel to replace an impacted perennial/intermittent tributary to Shacks Branch. However, the channel will be placed much higher on fill and will have a steep gradient section before re-entering Shacks Branch. Additionally, there is little opportunity to provide meanders or other natural features typical for a "natural stream" design. Past efforts to provide mitigation on fill have not been favorably received by the Division of Water and other regulatory agencies. The steep outlet channel section would also be an obstruction to fish passage. Therefore, it is proposed to provide an in-lieu fee payment for mitigation.

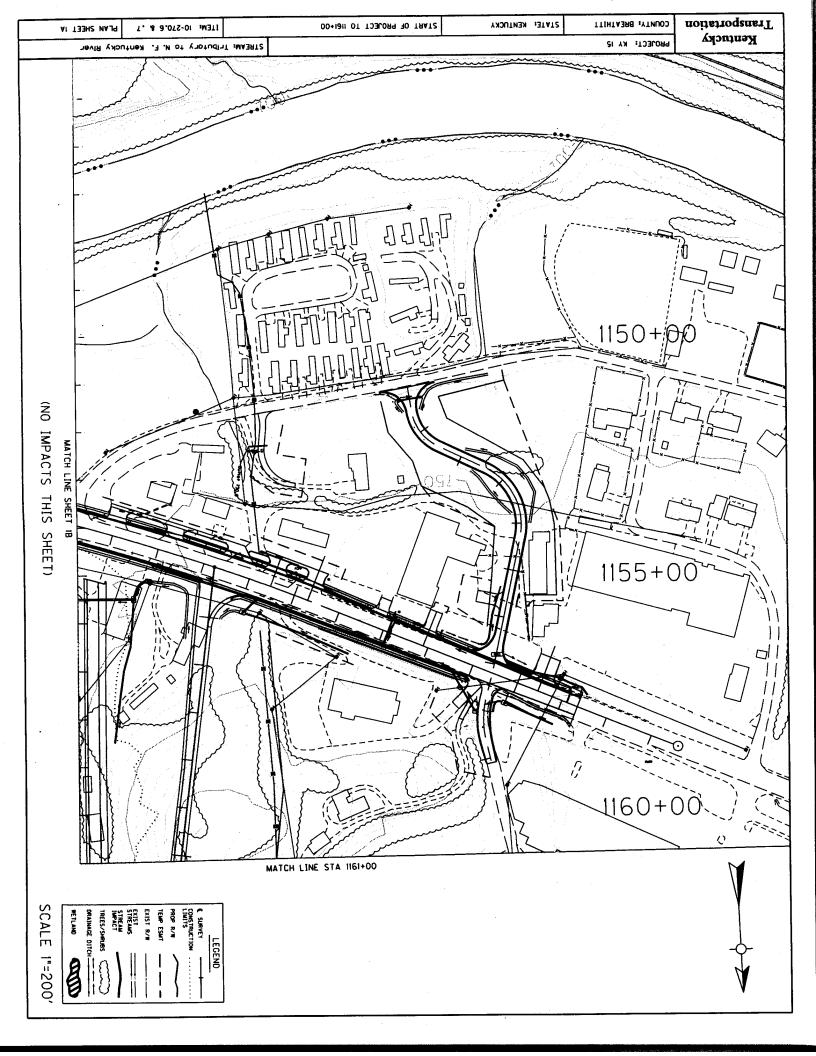
No wetlands were identified within the project corridor.

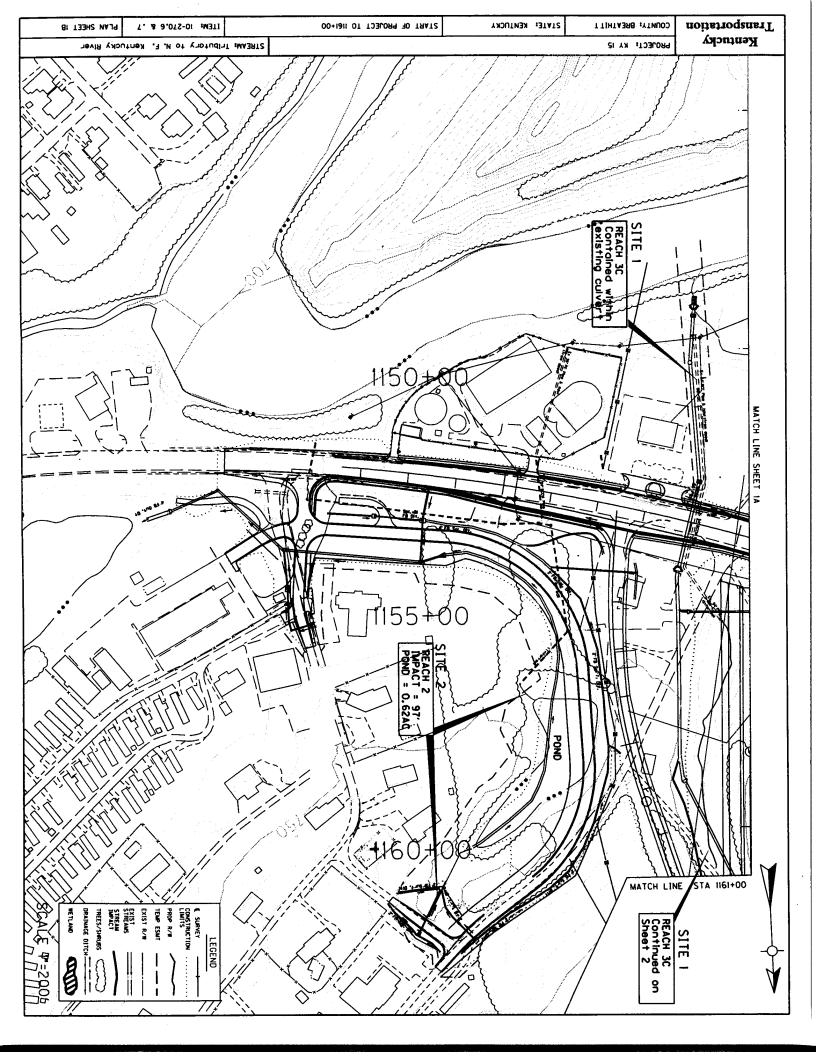
## SUMMARY OF IMPACTS ALONG ROADWAY REQUIRING MITIGATION

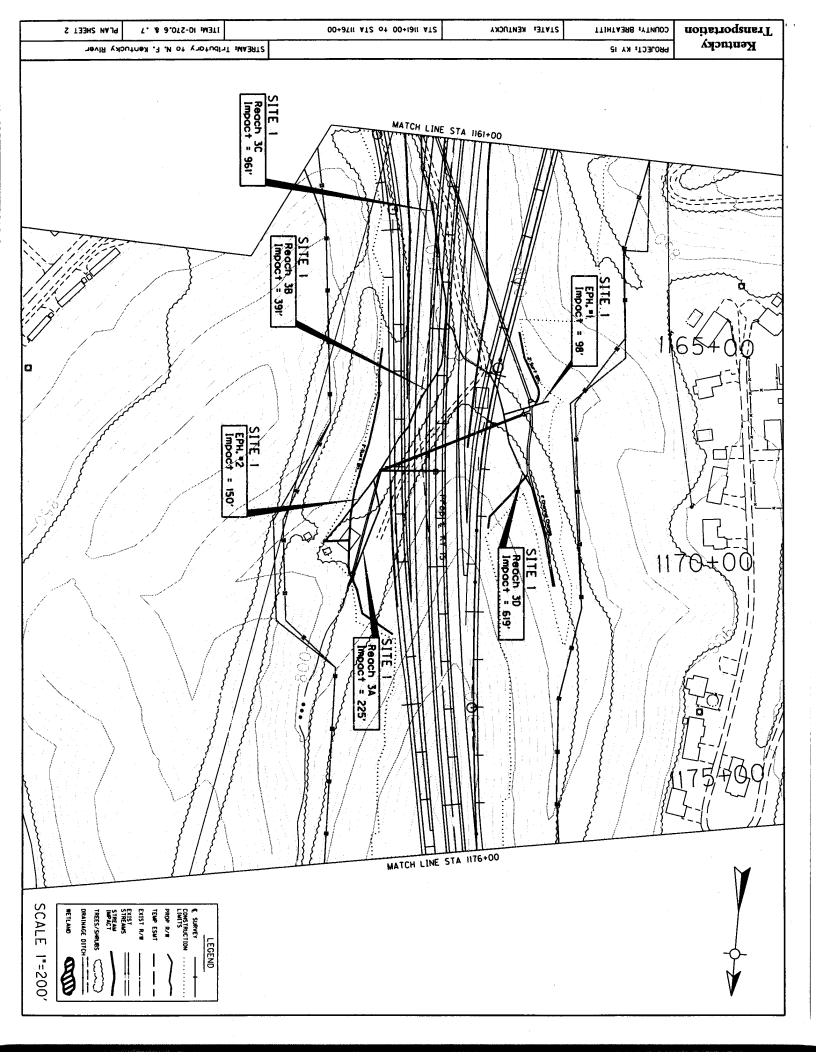
culvert culvert fill culvert & fill fill fill fill fill culvert & fill culvert fill culvert culvert culvert fill fill fill fill	2,209,176,15	Total Fee ≃		000000000000000000000000000000000000000	990999999999999999999999999999999999999	re mitigation	K Fill Site #1 is not used this impact will not require mitigation	* Fill Site #1 is not use	***************************************
wyasseshad         Project         Type         EPARED         Impact         Impa	00000000000000000000000000000000000000	***************************************							
water stream (I)         Station         Type         Grown         Langit (ft)         Area (at.)         Impact         Impact	724,599.60		0.04	417	121	Perennial	1235+30 to Rt. 1238+00	Reach &C (Roadway)	
Watershad         Project         Strain         EPAREP         Inpact         Impact         Impact           Strown ID         Station         Type         Score         Legin ID         Impact         Impact           Reach 3B         1164+90 fo Rt. 1168+30         Perennial         123         391         0.02         culvert           Reach 3C         1155+60 fo 1164+90         Perennial         123         961         0.05         culvert           Reach 3D         1164+90 fo Lt. 1170+50         Perennial         127         619         0.04         culvert           Reach 2         28+40 to 44+50         Intermittent         93         97+427(pond)         0.04         culvert           Eph.#2 (Roadway)*         1197+00         Ephemeral         117         253         0.04         fill           Reach 7A         Right 1205+73         Perennial         78         477         0.03         culvert & fill           Reach 7C         Left 1205+73         Perennial         95         760         0.11         culvert           Reach 8A         1206+60 to 1218+60         Perennial         98         1262         0.09         fill	550,962,00		0.21	1790	192	Perennial	1218+60 to 1235+30	Reach 8B	
Watershed         Project         Strain         EPAREP         Inpact         Impact         Impact           8th Description         Type         Score         Length (ft)         Are lact         Impact           Reach 3B         1164+90 to Rt. 1168+30         Perennial         123         391         0.02         culvert           Reach 3C         1155+60 to 1164+90         Perennial         123         961         0.05         culvert           Reach 3D         1164+90 to Lt. 1170+50         Perennial         127         619         0.04         culvert           Reach 2         28+40 to 44+50         Intermittent         93         97+427(pond)         0.04         culvert           Eph.#2 (Roadway)*         1197+00         Ephemeral         117         253         0.04         fill           Reach 7B         1205+73         Perennial         115         666         0.09         culvert & fill           Reach 7C         Left 1205+73         Perennial         95         760         0.11         culvert	352,098.00		60.8	1262	98	Perenniai	1206+60 to 1218+60	Reach 8A	
watershed         Project         Strain         EPAREP         Impact         Impact         Impact           ar         Straint         Type         Score         Length (ft)         Are (ac)         Impact           Reach 3B         1164+90 to Rt. 1168+30         Perennial         123         391         0.02         culvert           Reach 3C         1155+60 to 1164+90         Perennial         123         961         0.05         culvert           Reach 3D         1164+90 to Lt. 1170+50         Perennial         127         619         0.04         culvert           Reach 2         28+40 to 44+50         Intermittent         93         97+427(pond)         0.04         culvert & fill           Eph.#2 (Roadway)*         1197+00         Ephemeral         117         253         0.04         fill           Reach 7B         1205+73         Perennial         78         477         0.03         culvert & fill           Reach 7B         1205+73         Perennial         115         666         0.09         culvert	203,490.00	culvert	0.11	780	35	Perennial	Left 1205+73	Reach 7C	
Watershed         Project         Strain         EPAREP         Impact         Impact         Impact           4r         Strain (1)         Type         Score         Length (ft)         Average         Impact           Reach 3B         1164+90 to Rt. 1168+30         Perennial         123         391         0.02         culvert           Reach 3C         1155+60 to 1164+90         Perennial         123         961         0.05         culvert           Reach 3D         1164+90 to Lt. 1170+50         Perennial         127         619         0.04         culvert           Reach 2         28+40 to 44+50         Intermittent         93         97+427(pond)         0.04         culvert & fill           Eph.#2 (Roadway)*         1197+00         Ephemeral         117         253         0.04         culvert & fill           Reach 7A         Right 1205+73         Perennial         78         477         0.03         culvert & fill	187,012.80	culvert	0.09	566	115	Perennial	1205+73	Reach 78	
Watershed         Project         Stream ID         EPAREP Stream ID         Impact Impact         Impact Impact           4r         Stream ID         Station         Type         Scora         Langili (ft)         Average         1194         1194           Reach 3B         1164+90 to Lt. 1164+90         Perennial         123         391         0.02         culvert           Reach 3C         1164+90 to Lt. 1170+50         Perennial         127         619         0.04         culvert           Reach 2         28+40 to 44+50         Intermittent         93         97+427 (pond)         0.04         culvert & fill           Eph.#2 (Roadway)*         1197+00         Ephemeral         117         253         0.04         fill	121,716.75	culvent & fill	0.03	477	78	Perennial	Right 1205+73	Reach 7A	රි
Watershad         Project         Stream         EPARBP         Impact         Impact         Impact           8         Stream ID         Station         Type         Scora         Langit (ft)         Area (ac)         Type           Reach 3B         1164+90 to L1.1164+30         Perennial         123         391         0.02         culvert           Reach 3C         1155+60 to 1164+90         Perennial         123         961         0.05         culvert           Reach 3D         1164+90 to L1.1170+50         Perennial         127         619         0.04         culvert & fill           Reach 2         28+40 to 44+50         Intermittent         93         97+427(pond)         0.04         culvert & fill	24,591.60	\$ } }	0.04	253	117	Ephemeral	1197+00	Eph.#2 (Roadway)*	CF
Watershad         Project         Stream         EPA RBP         Impact         Im	00.0007.49	culvert & fill	0.04	97+427(pond)	93	Intermittent	28+40 to 44+50	Reach 2	ಸ
Watershild         Project         Stream         EPARBP         Impact         Im	187,185,50	culven	0.04	619	127	Perennial	1164+90 to Lt. 1170+50	Reach 3D	
watershed         Project         Stream         EPARBP         Impact         Imp	266,389.20	culvert	0.05	961	123	Perennial	1155+60 to 1164+90	Reach 3C	
watershad Project Stream EPARBP Impact Impact Impact ar Stream I.D. Station Type Score Length (ft) Area (ac) Type	117,534.60	culvert	0.02	391	123	Perennial	1164+90 to Rt. 1168+30	Reach 3B	
	Fee Amount (\$)	Type	Impaci Area (ac)	Impact Length (ft)	EPA REP Score	Stream Type	Project Station	Watershed, Stream I.D.	Site Number

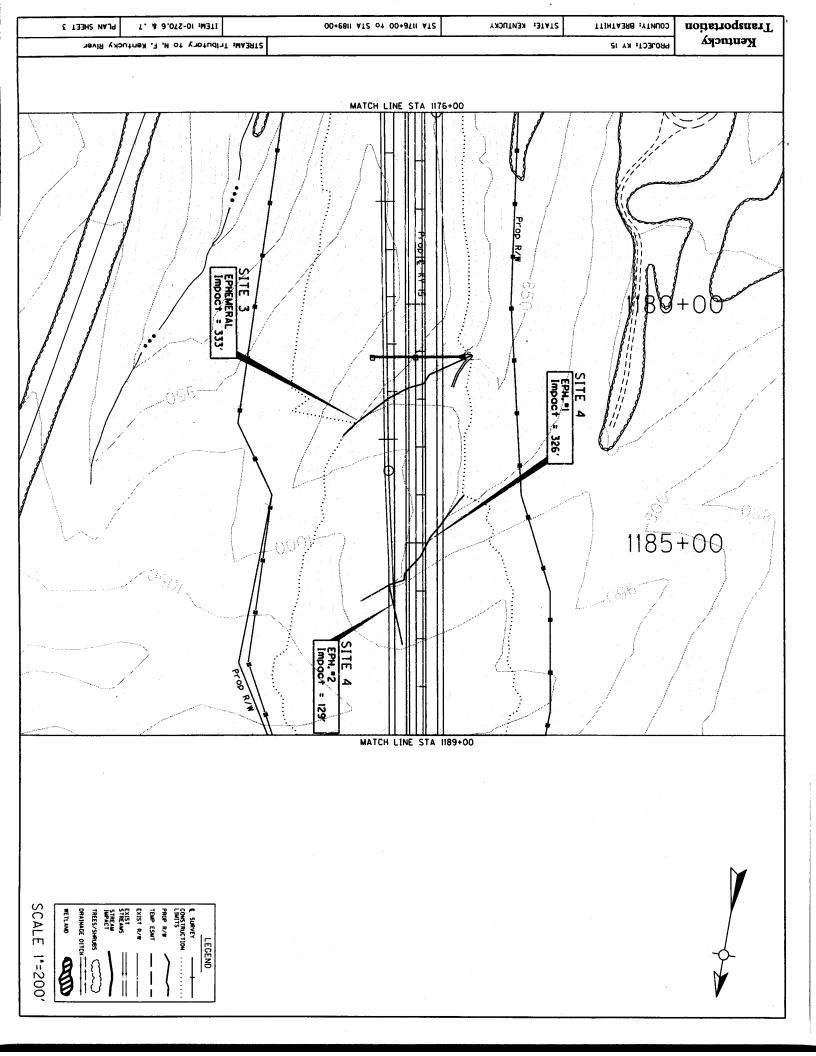
# SUMMARY OF IMPACTS AT EXCESS FILL SITES REQUIRING MITIGATION

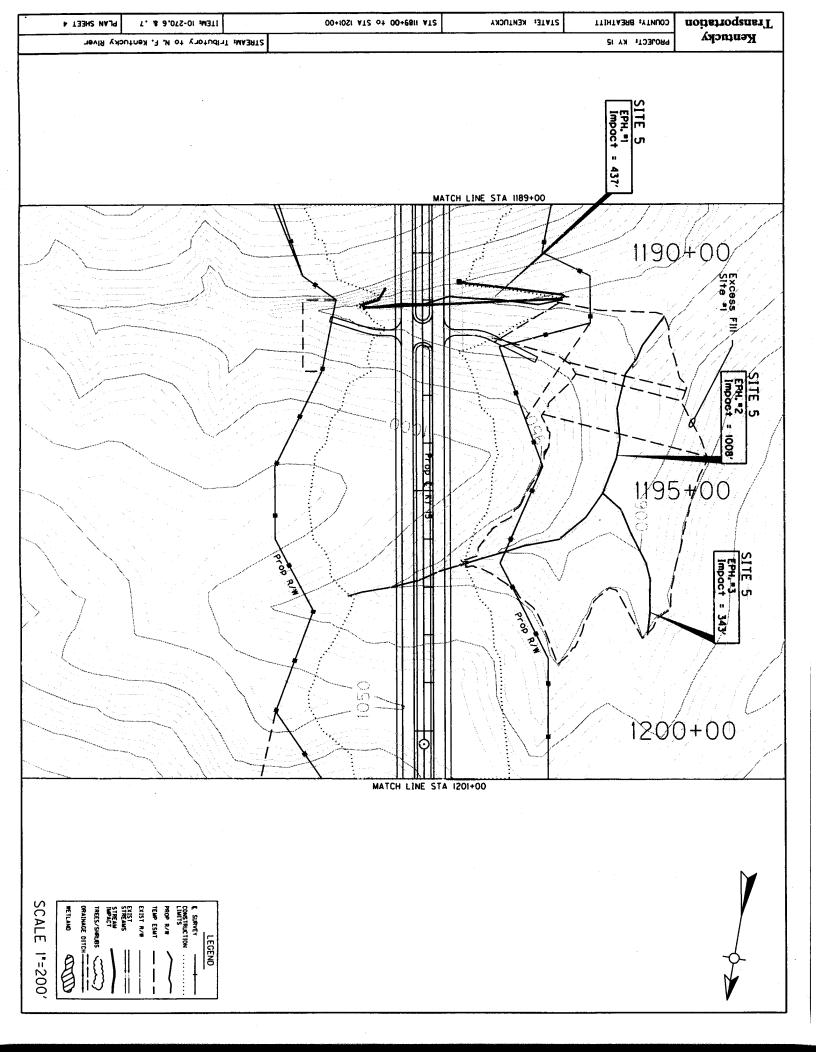
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478,177.20	Fill Site #2=							
284,256.00	,	0.23	1410	126	Intermittent		Reach 8D	
193,921.20	fill	0.06	649	121	Perennial	Fill Site #2	Reach 8C (Fill)	**************************************
73,386.00	Fill Site #1=							
73,386.00	fill	0.12	755	117	Ephemeral	Fill Site #1	Eph.#2 (Fill)	S
Fee Amount (3)	Type	Impact Area (ac)	Impact Length (ft)	EPA REP	Stream	Project Station	Watershed, Stream LD	Site

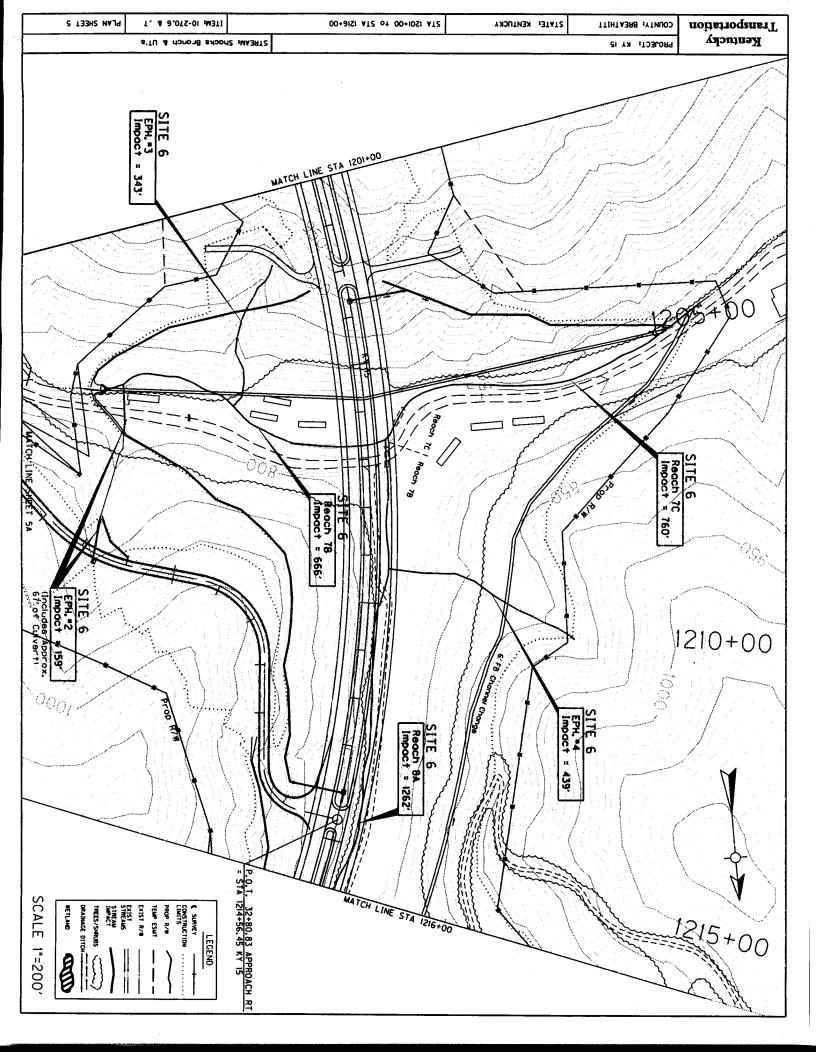


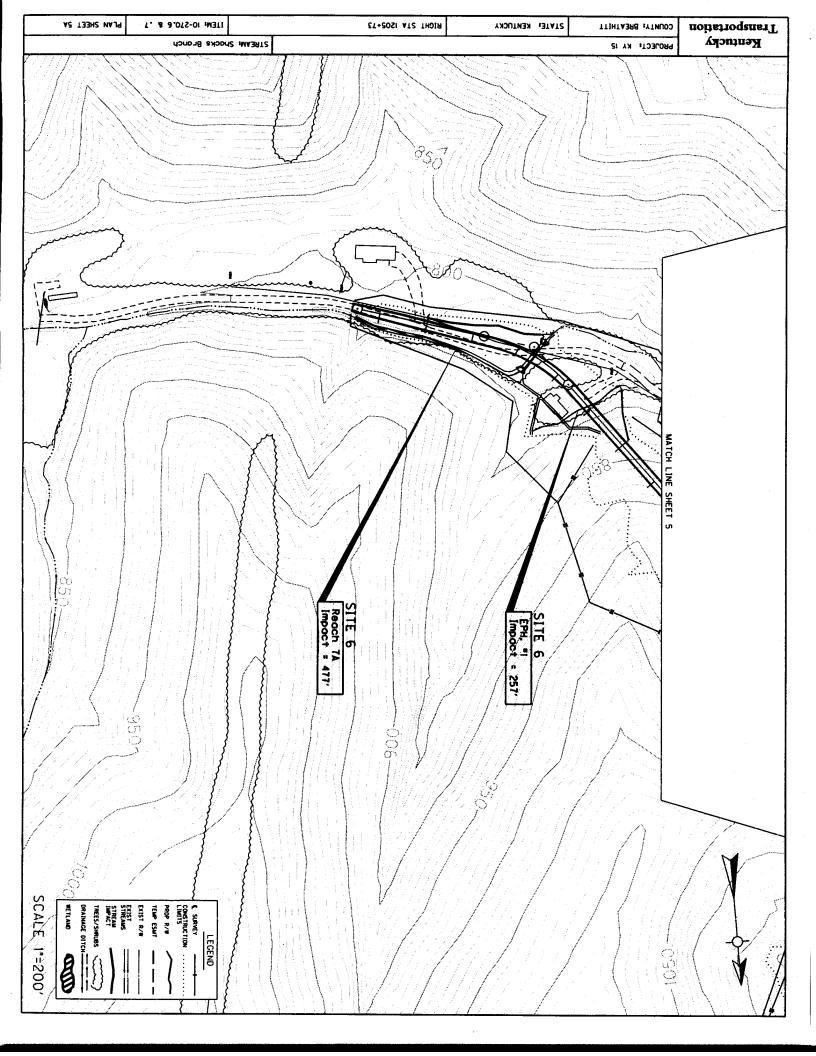


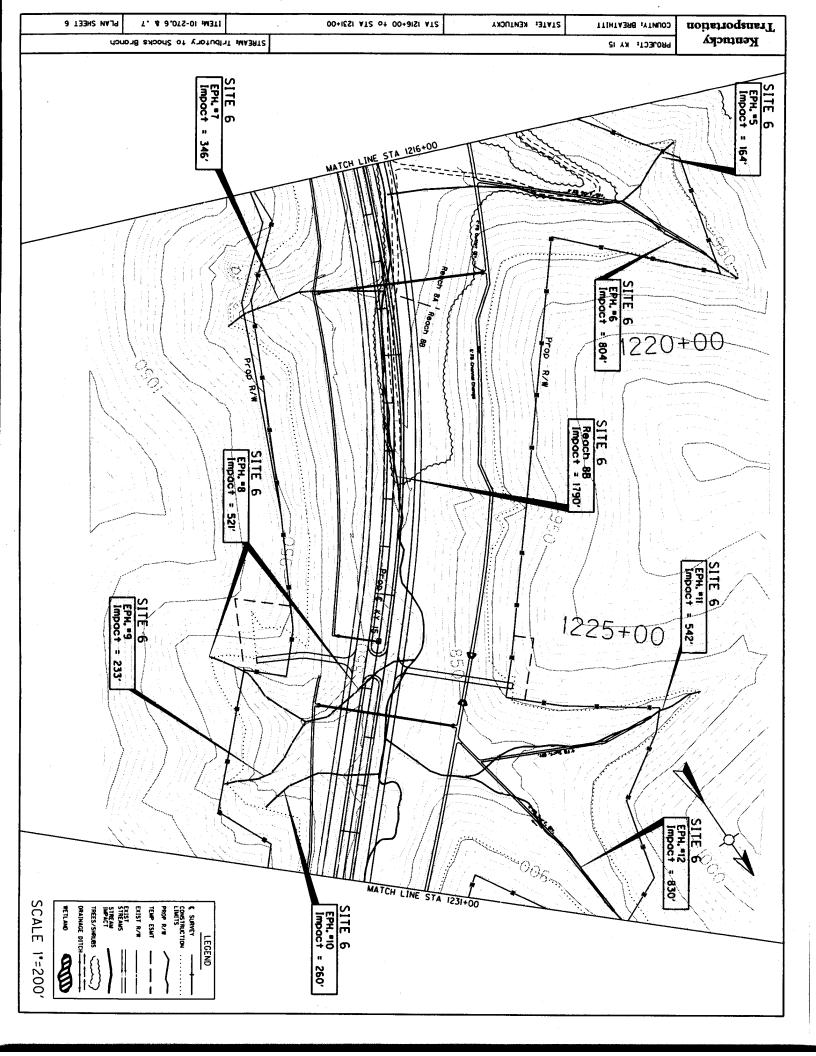


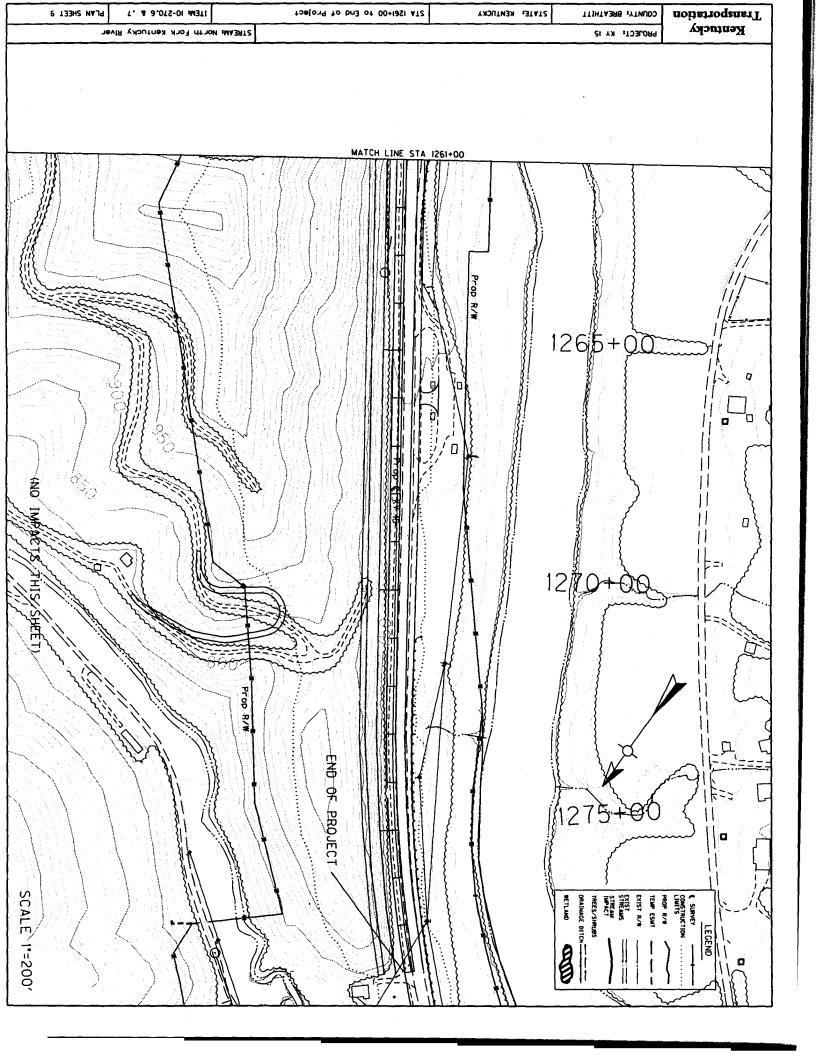


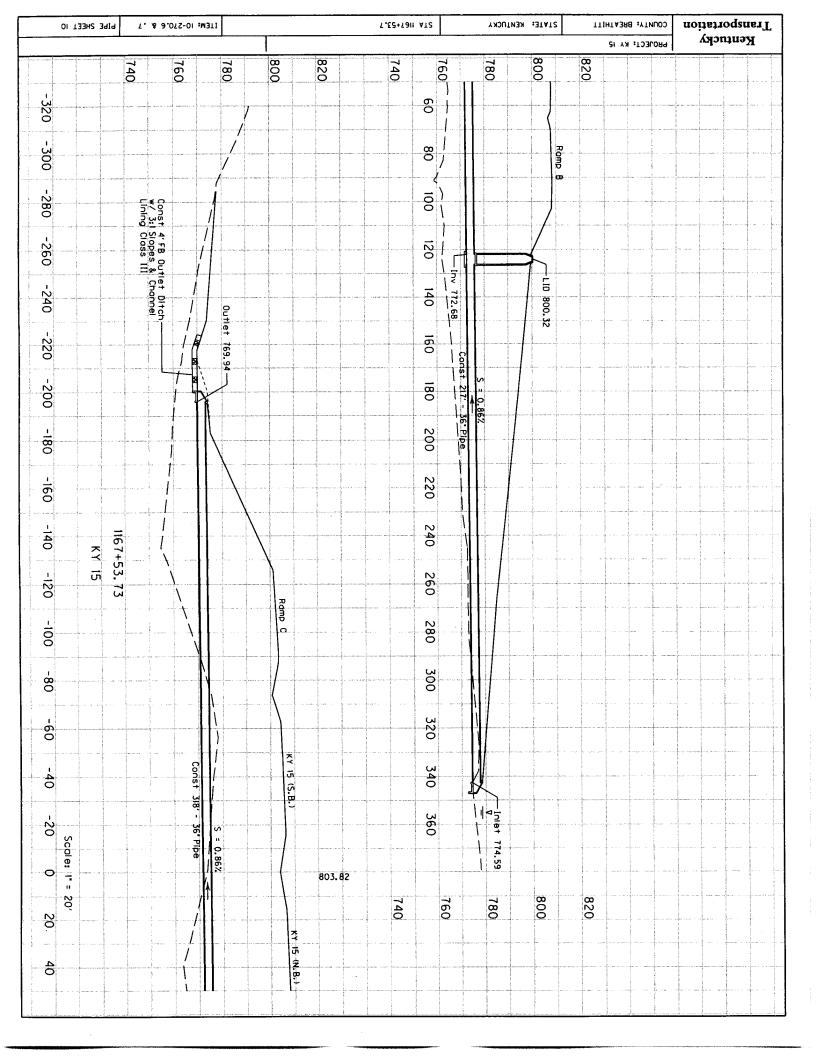


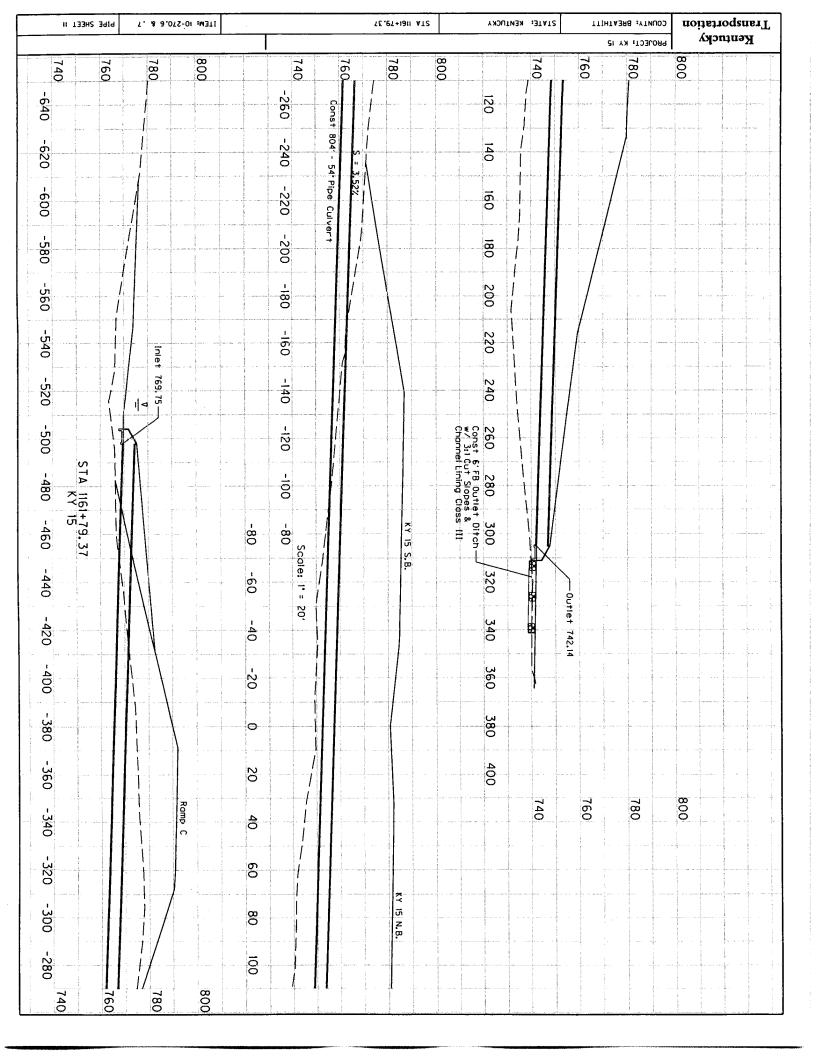


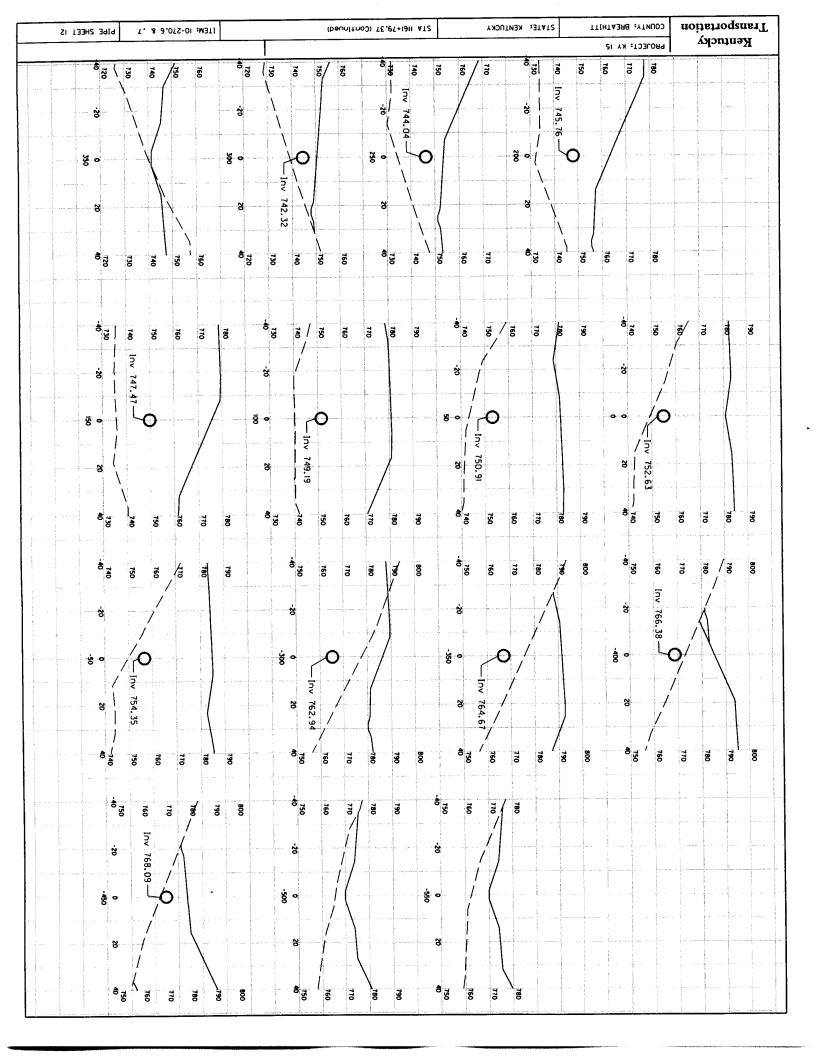




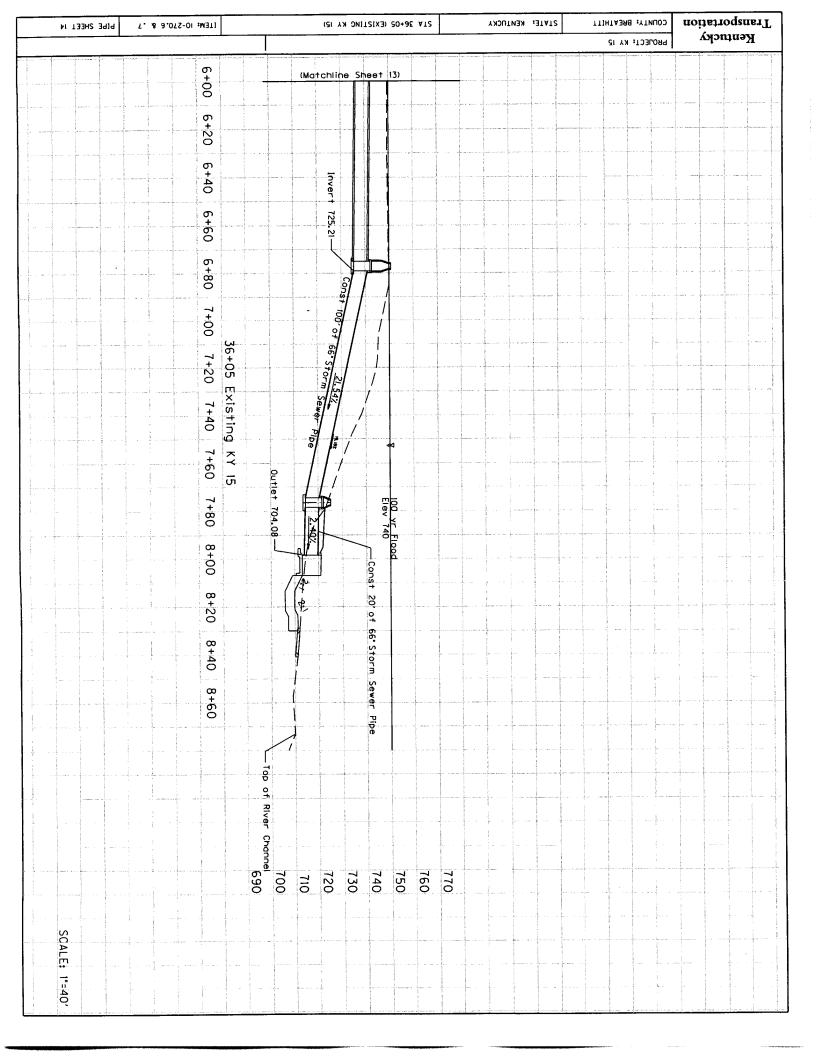




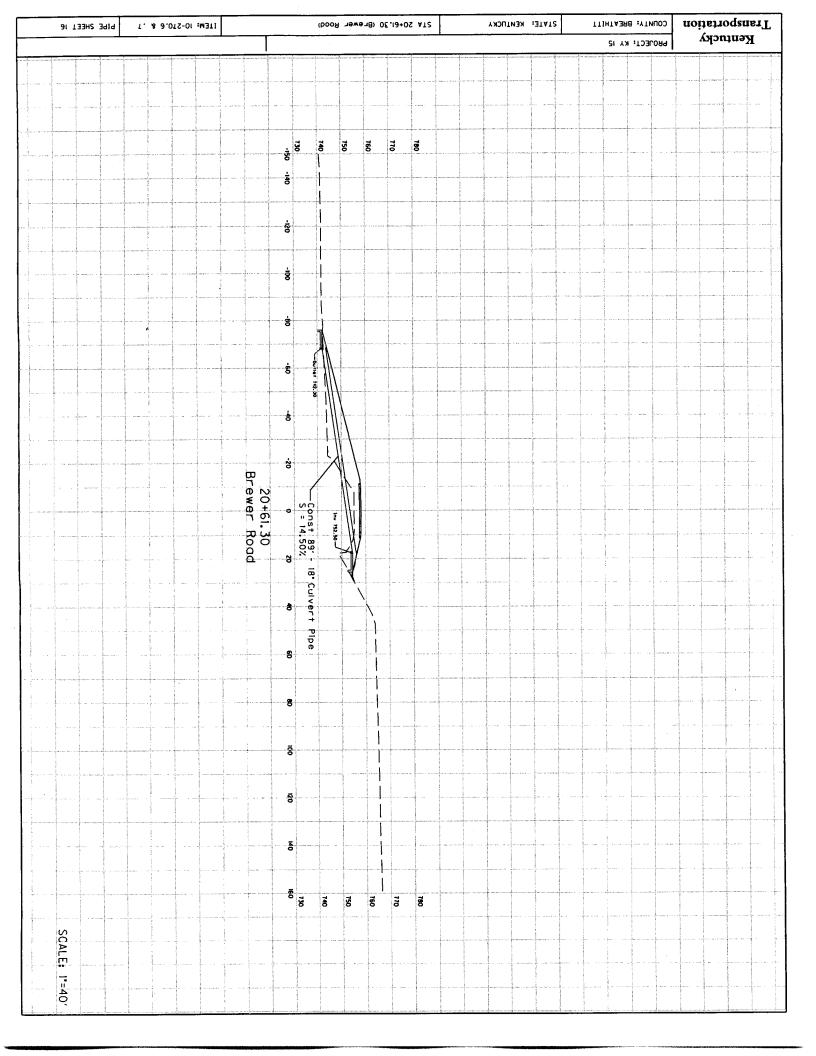


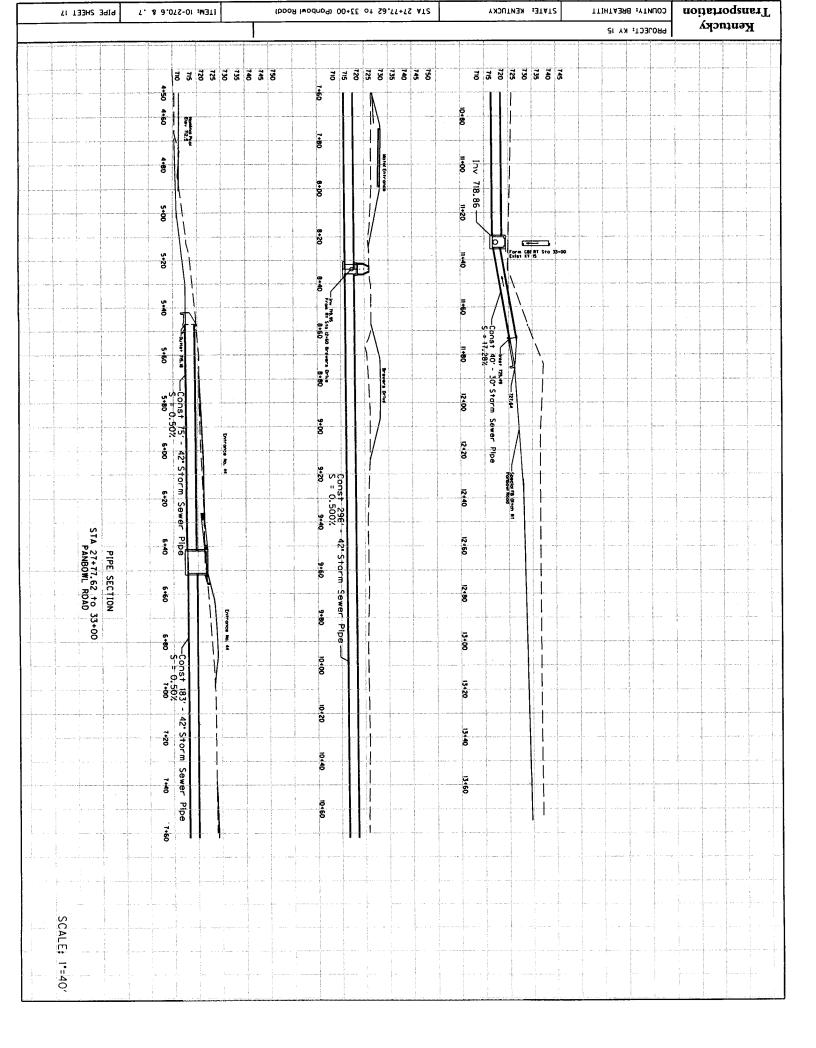


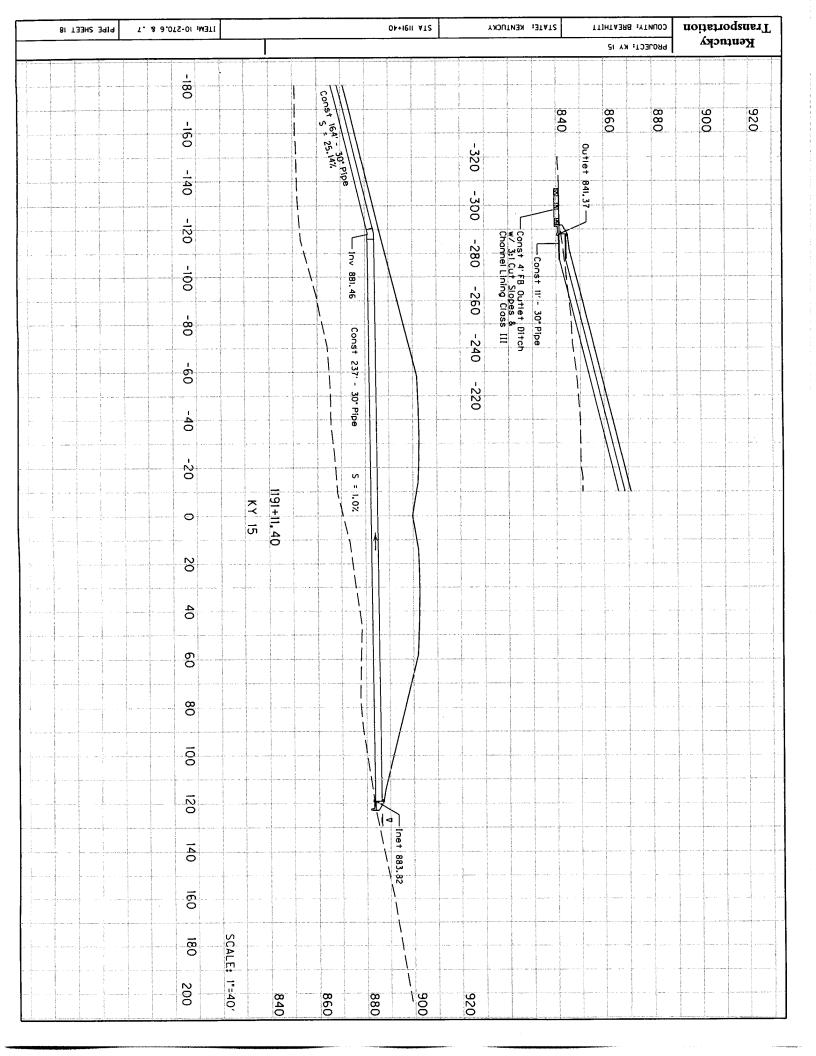
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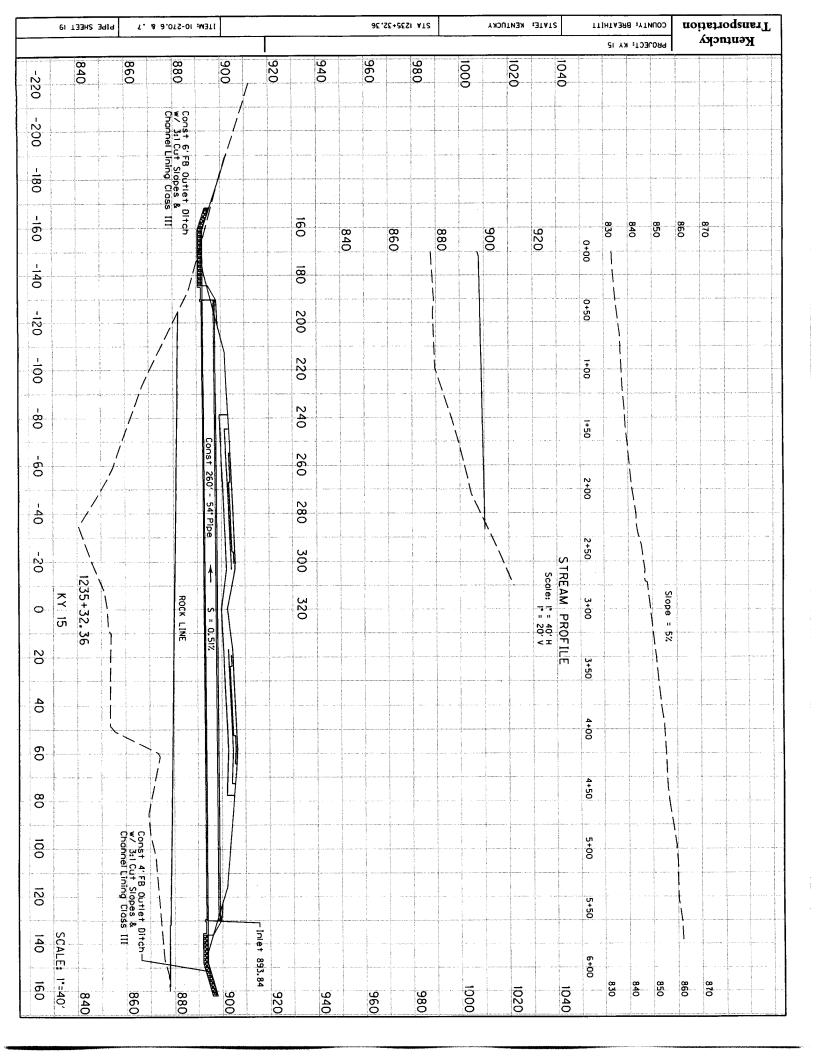


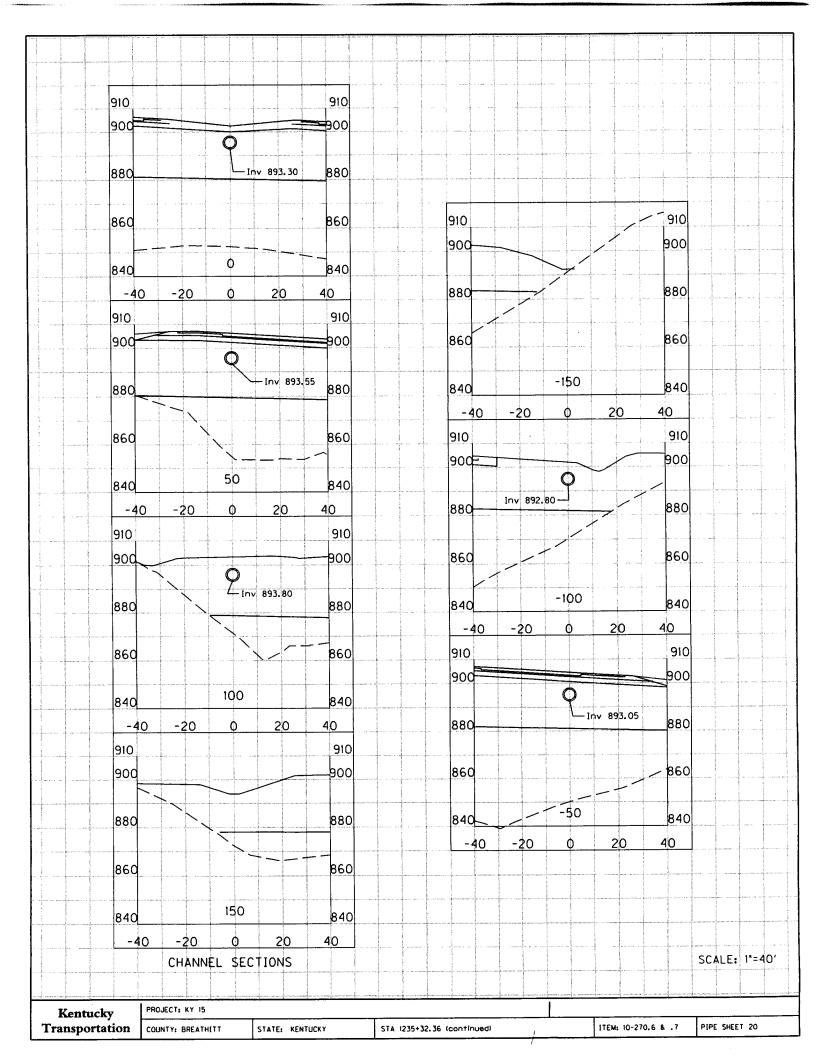
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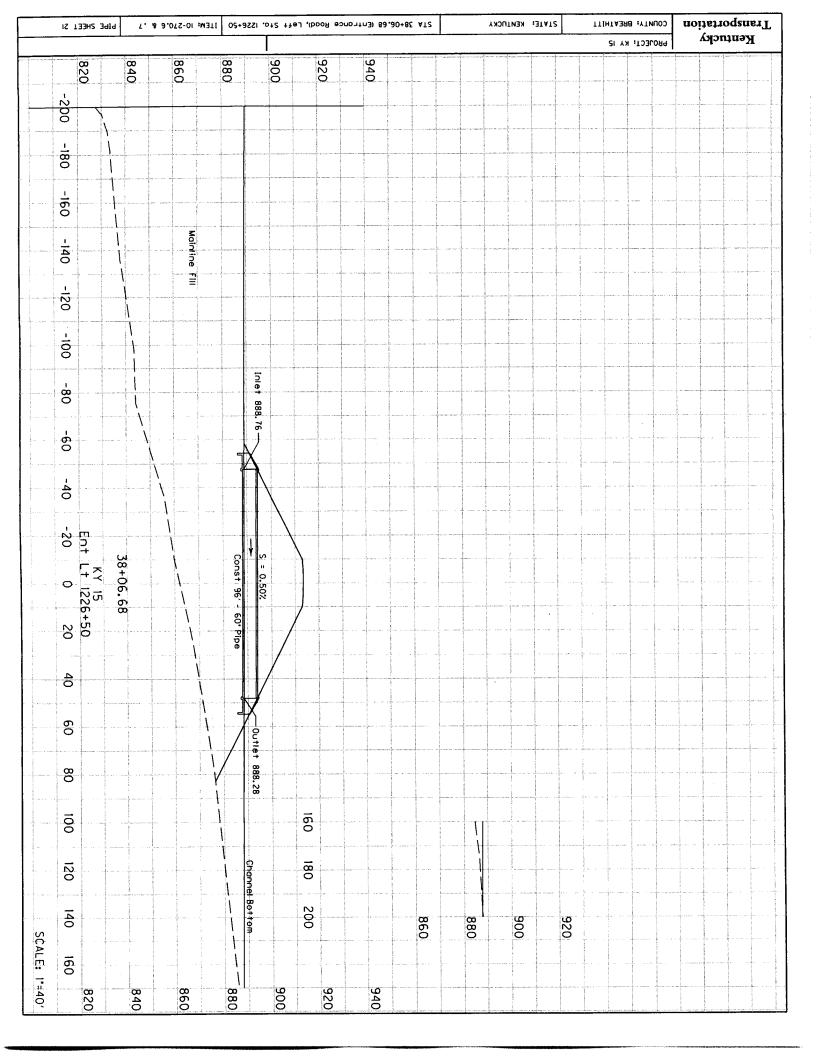


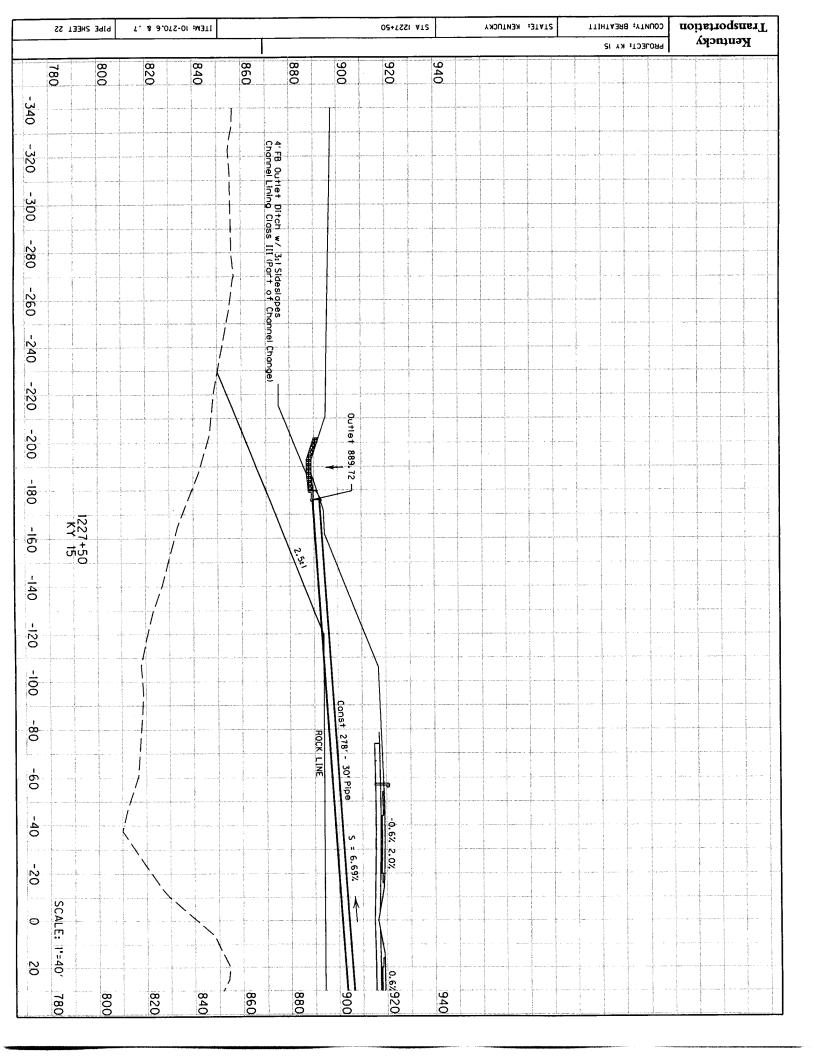


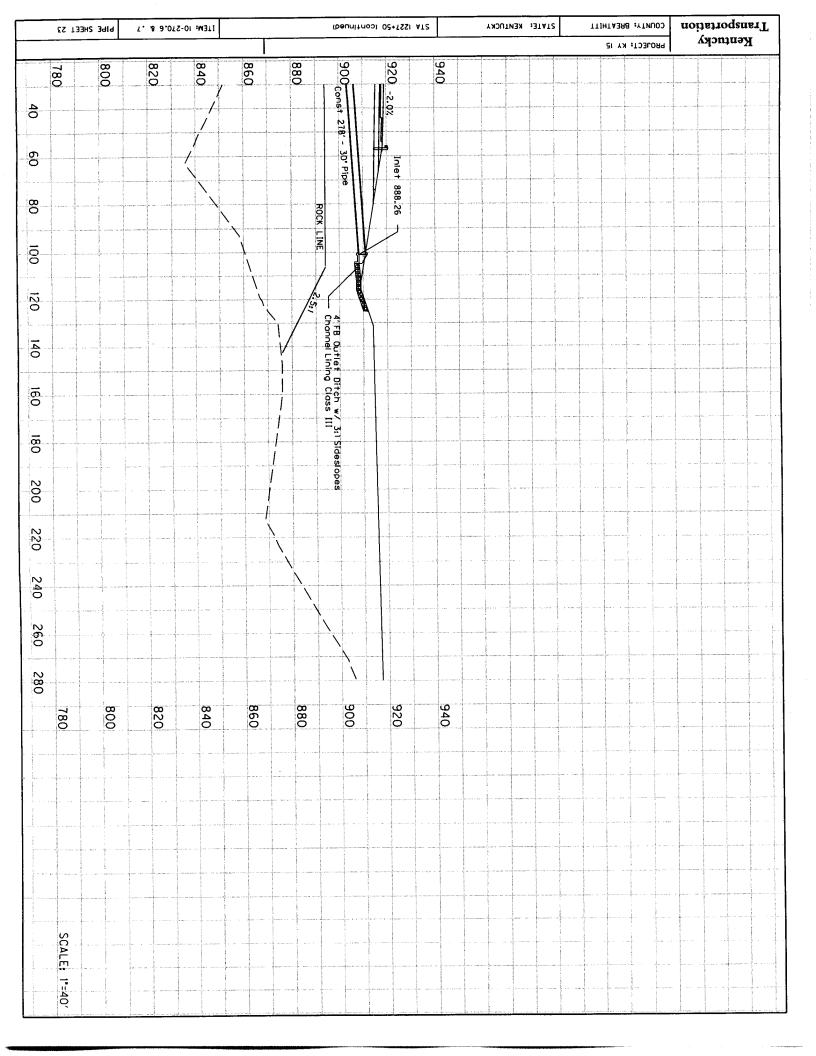


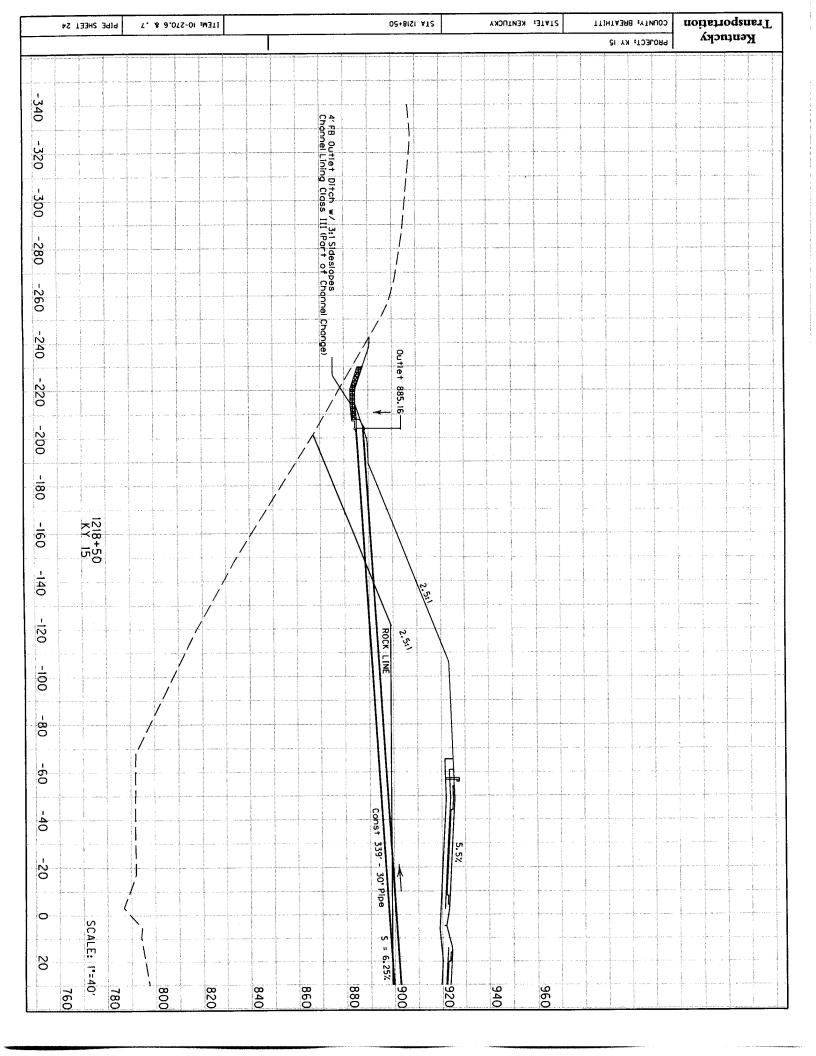


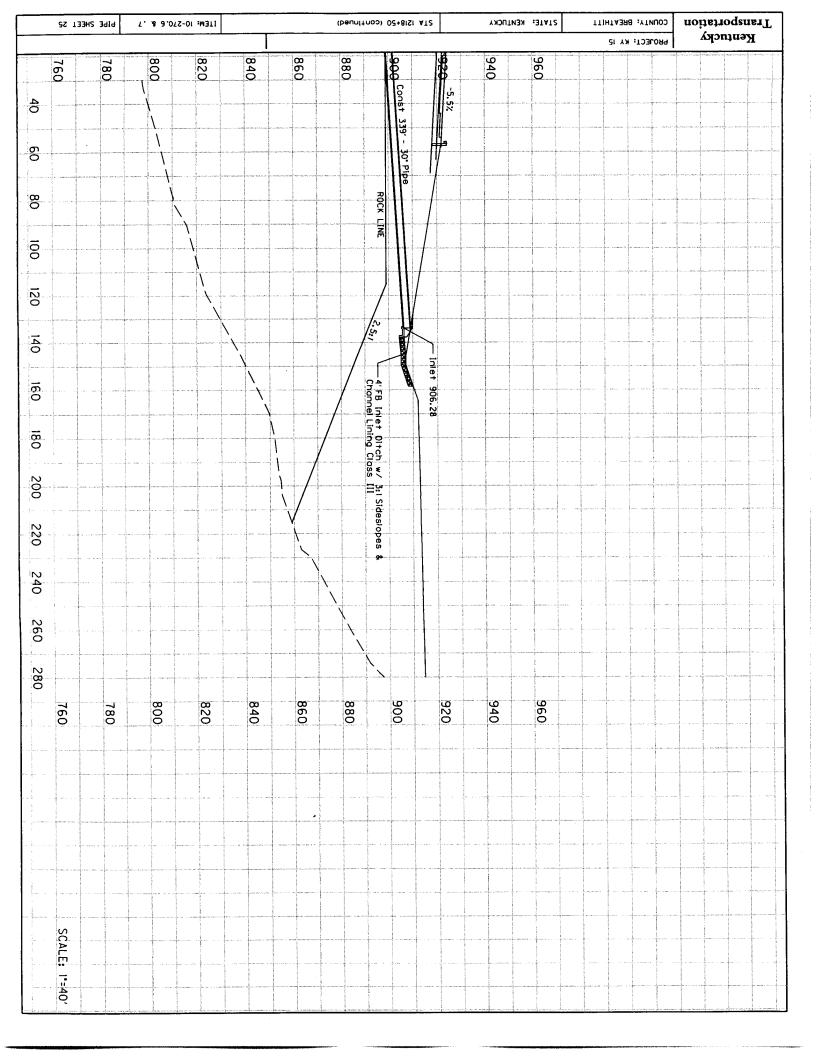


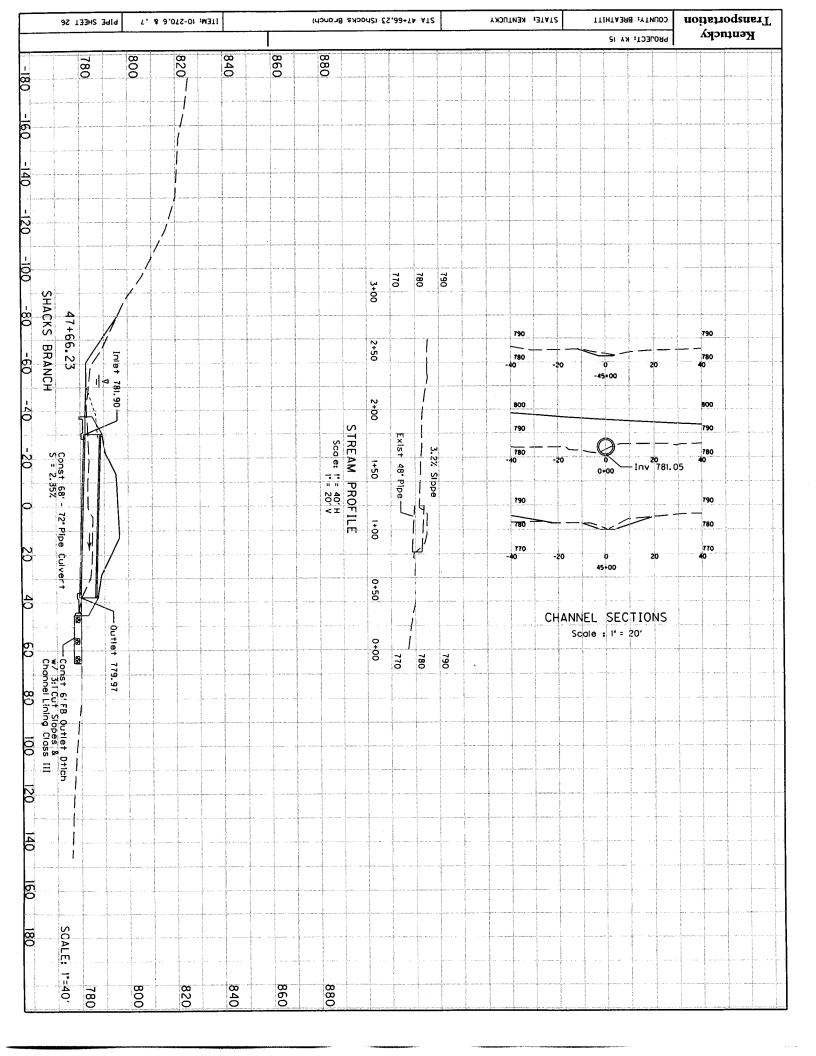


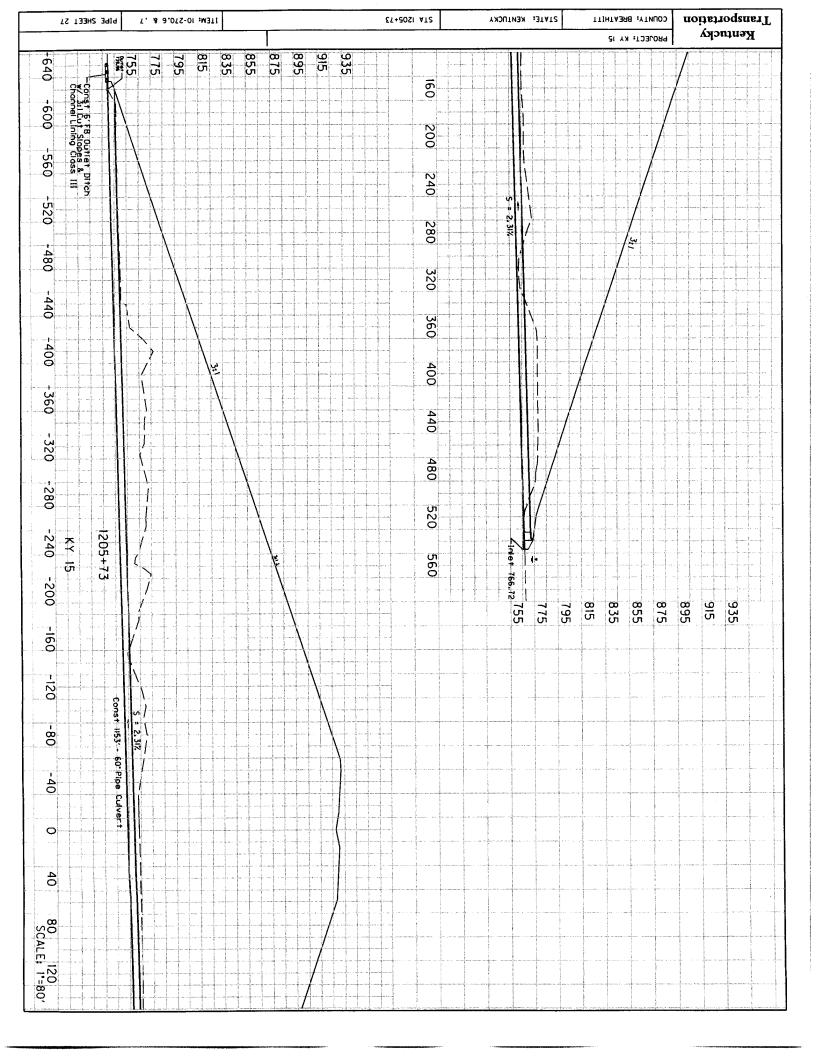


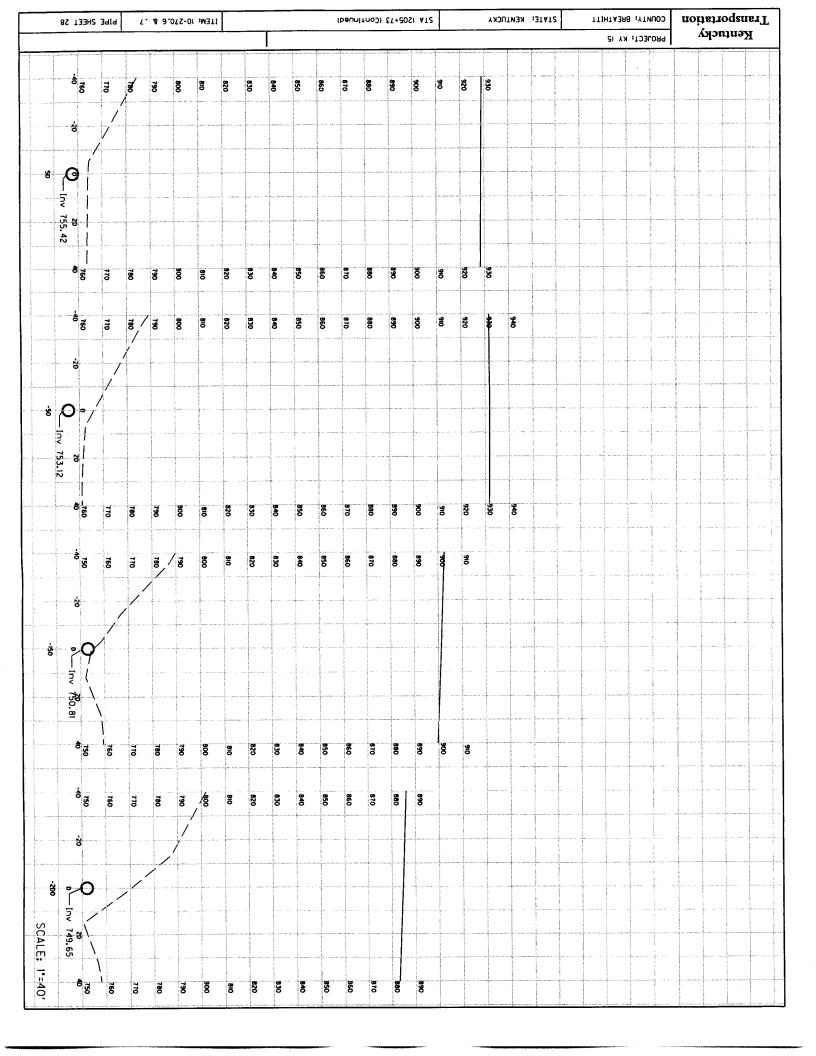


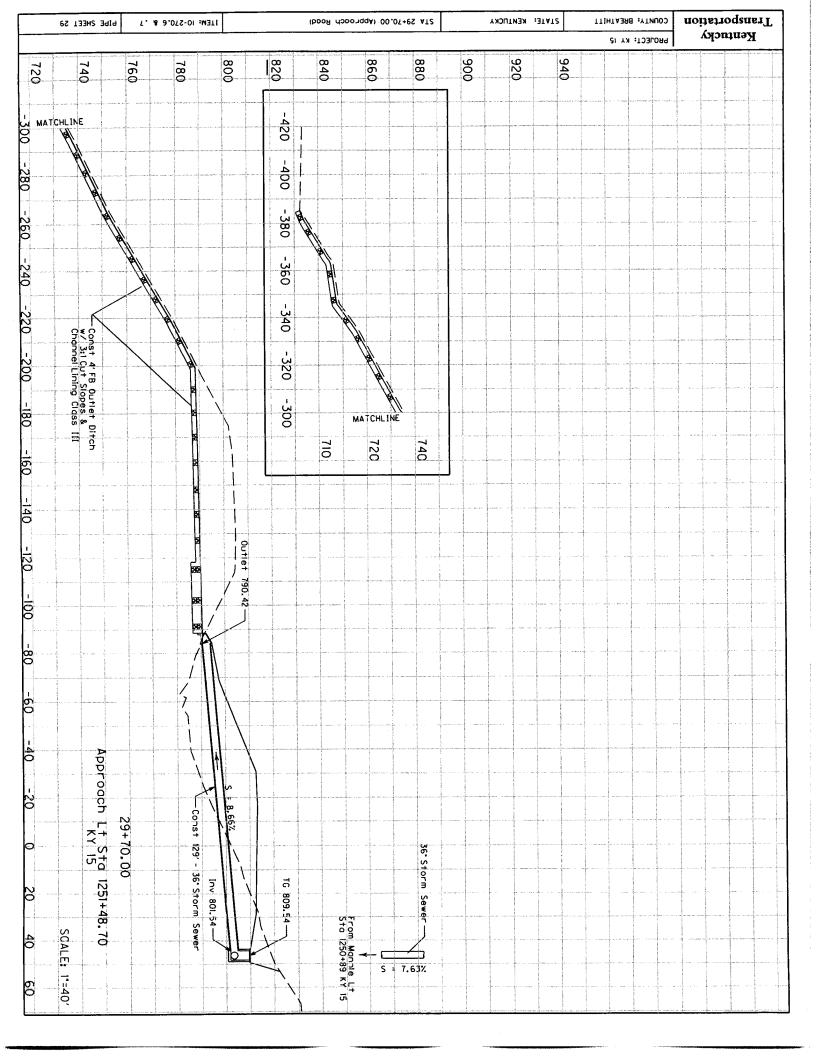


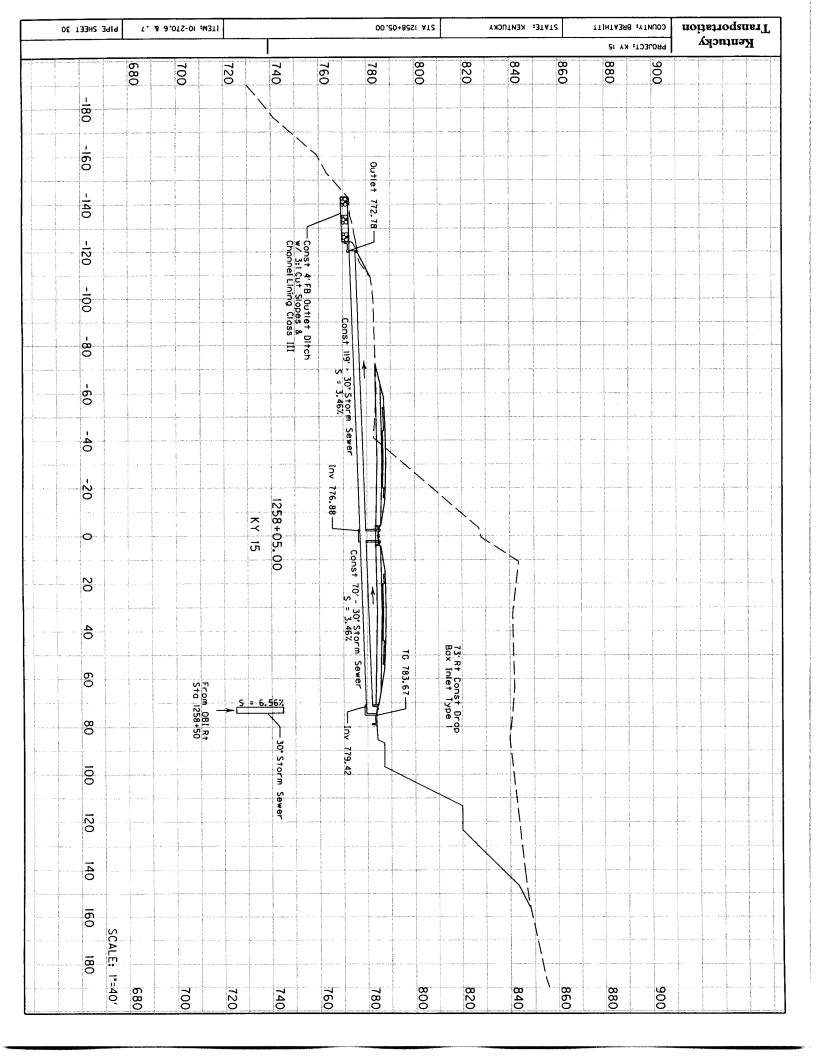












1	Reach 2				-			
STREAM NAME:		<u>-</u>	LOCA	ATION:	V4 A D:	NOW (M) -	orth Fork KY River)	
STATION:	DRAINAGE	E AREA (AC)	BASI	N/WATERSHE		ver (No		
LAT:	LONG:		COL	-Jackson COUNTY; -Breathitt USGS 7.5 TOPO;				
-10/24/06	LONG.			- Rob Lewis, Julie Clark				
DATE:	TIME:			INVESTIGATORS;				
TYPE SAMPLE: □ P-C		1acroinvertebrate	□ FISH [					
WEATHER: Nov		4 hours			rain in the last 7 days?	•		
		avy rain ady rain	□Yes Air temper	☑No sature 50	°C. Inches raint	fall in n	ast 24 hours 0 in	
		ermittent showers	85 % (	Cloud Cover		m	III	
$\square$		ar/sunny						
		(mg/l)	% Saturation	pH(S	S.U.) Cond.	44	49 ☐ Grab	
INSTREAM WATERSH							·	
FEATURES Stream Width 3		OCAL WATERS redominant Surrou						
Stream Width 3 Range of Depth $0.1$	— "   PI	l Surface Mining		e: Construct	ion 🛭 Forest	t		
Average Velocity	— ft/s   □	Deep Mining		☑ Commerc			ing	
Discharge	cfs   🗆	l Oil Wells		☐ Industrial				
Est. Reach Length	□	l Land Disposal		□ Row Crop	os 🗹 Urban	Runof	f/Storm Sewers	
Hydraulic Structures:	I	St	ream Flow;			ream T		
□ Dams □		ments   Dry	√ ☑ Poole		□ Normal □	Pere	nnial  Intermittent	
	Waterfalls	<b>☑</b> Hig	gh 🛭 Very	Rapid or Torre	ntial 🗆	Eph	emeral   Seep	
Other 🗹	Culverts		1.00	T a ==			1 414	
Riparian Vegetation:		Dom. Tree/Shru	ib Taxa	Canopy Cove	er; sposed (0-25%)		nel Alterations; Dredging	
Dominate Type:  ☐ Trees ☑	Shrubs				Exposed (0-25%)		Channelization	
	Herbaceous				Shaded (50-75%)		(☑ Full □ Partial)	
Number of Strata /					aded (75-100%)			
Substrate   ☑ Est. □	P.C	Riffle	%	Run;	%	Pool	100 %	
Silt/Clay (<0.06 mm)							100	
Sand (0.06-2 mm)								
Gravel (2-64 mm)								
Cobble (64-256 mm) Boulders (>256 mm)								
Bedrock						ļ —		
Habitat		· · · · · · · · · · · · · · · · · · ·		Condition	Category			
Parameter		ptimal		otimal	Marginal		Poor	
1 Full 1		70% of substrate		f stable habitat;	20-40% mix of stable ha		Less than 20-% stable habitat" lack of habitat is	
1. Epifaunal Substrate/	favorable for	epifaunal and fish cover;	well suited for colonization po		habitat availability less t desirable; substrate	nan	obvious; substrate unstable or	
Available		submerged logs,	adequate habit		frequently disturbed or		lacking.	
Cover	undercut banl	ks, cobble or	maintenance o	f populations;	removed.		-	
	other stable h		presence of ad					
		full colonization, logs/snags that	substrate in the					
	are <u>not</u> new fa		colonization (r	nay rate at				
	transient.		high end of sca	ale).				
SCORE	20 19	18 17 16		3 12 11	Gravel, cobble, and bou	der	5 4 3 2 1 0 Gravel, cobble, and boulder	
2. Embeddedness	particles are (	le, and boulder 0-25%	Gravel, cobble particles are 2:		particles are 50-75%	iuer	particles are more than 75%	
2. Emocadouness		y fine sediment.	surrounded by		surrounded by fine sedir	nent.	surrounded by fine sediment.	
	Layering of c	obble provides			_	ļ	_	
CCORE	diversity of n		15 14	12 12 11	10.0.9.7		5 4 3 2 1 0	
SCORE	20 19	18 17 16	15 14 Only 3 of the 4	13 12 11	10 9 8 7 0 Only 2 of the 4 habitat	6	Dominated by 1	
3. Velocity/Depth	All four veloc	city/depth ent (slow-deep,	present (if fast		regimes present (if fast-		velocity/depth regime.	
Regime		, fast-deep, fast-	missing, score	lower than if	shallow or slow shallow	are		
	shallow. Deep	p > 1.5 feet.	missing other	regimes)	missing, score low)		$\bigcirc$	
SCORE	20 19	18 17 16	15 14	13 12 11	10 9 8 7	6	5 4 3 2 1 0	

4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine		
Deposition	islands or point bars and less	formation, mostly from	gravel, sand or fine sediment on old and new bars; 30-50%	material, increased bar development; more than 50%		
	than 5% of the bottom affected	gravel, sand or fine sediment; 5-30% of the bottom	of the bottom affected;	of the bottom changing		
	by sediment deposition.	affected; slight deposition in	sediment deposits at	frequently; pools almost		
		pools.	obstructions, constrictions,	absent due to substantial		
		F	and bends; moderate	sediment deposition.		
			deposition of pools prevalent.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
5. Channel Flow Status	Water reaches base of both	Water fills > 75% of the	Water fills 25-75% of the	Very little water in channel		
	lower banks, and minimal	available channel; or <25%	available channel, and/or	and mostly present as		
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.		
COOPE	exposed.	exposed.	exposed.	5 4 3 2 1 0		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6 Channelization may be	Banks shored with gabion of		
6. Channel Alteration	Channelization or dredging absent or minimal; stream with	Some channelization present, usually in areas of bridge	extensive; embankments or	cement; over 80% of the		
	normal pattern.	abutments; evidence of past	shoring structures present on	stream reach channelized and		
	normar pattern.	channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat		
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed		
		be present, but recent	disrupted.	entirely.		
		channelization is not present				
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
7 Frequency of Riffles	Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or		
	frequent; spacing between riffles 5 to 7 stream widths.	infrequent; distance between riffles divided by stream	bottom contours provide some habitat; distance	shallow riffles; poor habitat; distance between riffles		
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >		
	streams where riffles are	width is between 7 to 15.	stream width is between 15	than 25.		
	continuous, boulders or logs		to 25.			
	are important.		1			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,		
_	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along		
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;		
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60- 100% of bank has erosional		
	affected.	areas of erosion.		1 100% of bank has crosional		
SCORE	Left Bank 10 9		5 4 3	scars.		
SCORE (LB)	Left Bank 10 9		3 4 3	scars.		
(LB)			5 4 3	scars.		
(LB) SCORE		8 7 6	0	scars. 2 1 0		
(LB) SCORE (RB)		8 7 6	0	2 1 0  Less than 50% of the		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native	5 4 3 50-70% of the streambank surfaces covered by	2 1 0  Less than 50% of the streambank surfaces covered		
(LB) SCORE (RB) 9. Vegetative	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone	8 7 6 8 7 6 70-90% of the streambank surfaces covered by native vegetation, but one class of	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation,	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average		
(LB) SCORE (RB) 9. Vegetative Protection	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average		
(LB) SCORE (RB) 9. Vegetative Protection (score each bank)	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
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(LB) SCORE (RB) 9. Vegetative Protection (score each bank)  SCORE (LB)	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
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(LB) SCORE (RB) 9. Vegetative Protection (score each bank)  SCORE (LB) SCORE (RB) 10. Riparian Vegetative	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  8 7 6  Width of riparian zone 12-18	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  Width of riparian zone <6		
(LB) SCORE (RB)  9. Vegetative Protection (score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e.,	8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  Width of riparian zone <6 meters; little or no riparian		
(LB) SCORE (RB)  9. Vegetative Protection (score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each bank riparian	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-	8 7 6  8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  8 7 6  Width of riparian zone 12-18	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  Width of riparian zone <6		
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(LB) SCORE (RB)  9. Vegetative Protection (score each bank)  SCORE (LB) SCORE (RB)  10. Riparian Vegetative Zone Width (score each bank riparian	Right Bank 10 9  More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not	8 7 6  70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only	5 4 3  50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	2 1 0  Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human		
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	Reach 3B		1.00	TION	-				
STREAM NAME:		<u> </u>	LOCA	ATION:	- Kentucky R	iver (No	orth Fork	KY River)	
STATION:	DRAINAGE	E AREA (AC)	BASI	N/WATERSHE					
LAT:	LONG:		COLI	NTY; -B	reathitt USGS 7.5 To	OPO:	-Jacks	on	
-10/24/06	LONG.		2001	- <u>D</u>	- Rob Lewis, Jul		<u> </u>		
DATE:	TIME::		PM INVE	STIGATORS;					
TYPE SAMPLE: P-C		lacroinvertebrate							
WEATHER: Nov		4 hours			rain in the last 7 days	?			
	∐ He	avy rain	□Yes	⊠No oture 50	°F Inches rain	fall in r	sact 24 hou	urs <u>0</u>	in
		eady rain ermittent shower	An temper	Cloud Cover	_ 1. menes tan	nan in p	Jast 24 110	uis <u>(</u>	***
	⊠Cle	ar/sunny		0.000					
P-Chem: Temp (°F)			% Saturation	pH(S	S.U.) Cond.	_1	15 🗆 (	Grab	
INSTREAM WATERSH	ED	· · · · · · · · · · · · · · · · · · ·							
FEATURES	L	OCAL WATER							
Stream Width 2.5		redominant Surro			· 174 r				
Range of Depth Average Velocity $0-0$	$\frac{.2}{\text{ft/s}}$ ft $\square$	Surface Minir Deep Mining		☐ Construct☐ Commerce		sı ıre/Graz	zina		
Discharge Discharge		Oil Wells		☐ Industrial		culture	anig		
Est. Reach Length		Land Disposa	1	□ Row Crop			ff/Storm S	Sewers	
Hydraulic Structures:	D 11 At		tream Flow;	ed 🗖 Low		tream T		□ Interm	ittant
□ Dams □ □ Island □	Bridge Abutr Waterfalls		y □ Poole gh □ Very				nemeral	□ Seep	intent
Other		<u> </u>	gii 🚨 Voiy	Rapid of Torre	-	<b>-</b> Ep	.c.me.u.	_ s <b></b> p	
Riparian Vegetation:		Dom. Tree/Shr	uh Taxa	Canopy Cove	or:	Chan	nel Altera	ations:	
Dominate Type:		Boin. Tree/Sii	do runu		sposed (0-25%)		Dredging		
✓ Trees ✓		Dogwood		☑ Partially	Exposed (25-50%)		Channelia		
	Herbaceous	Sugar Maple			Shaded (50-75%)		(D Fu	II 🗖 Par	tial)
Number of Strata3	<del></del>	Sycamore		☐ Fully Sh	naded (75-100%)				
Substrate 🗹 Est. 🛘	P.C	Riffle3	<u> %</u>	Run;	30%	Pool		40%	
Silt/Clay (<0.06 mm)		(	50		60			60	
Sand (0.06-2 mm)						-			
Gravel (2-64 mm)			30		30	ļ		30	
Cobble (64-256 mm)		]	0		10	-		10	
Boulders (>256 mm)  Bedrock									
Habitat				Condition	Category				
Parameter	Oı	ptimal	Subor	ptimal	Marginal			Poor	
	Greater than	70% of substrate	40-70% mix o	f stable habitat;	20-40% mix of stable h			han 20-%	
1. Epifaunal	favorable for	•	well suited for		habitat availability less	than	1	lack of his substrate un	
Substrate/ Available	}	and fish cover; submerged logs,	colonization pe adequate habit		desirable; substrate frequently disturbed or		lacking.	substrate un	istable Of
Cover	undercut bank	ks, cobble or	maintenance o	f populations;	removed.		3.		
	other stable h	abitat and at	presence of ad	ditional					
		full colonization, logs/snags that	substrate in the fall, but not ye						
	are <u>not</u> new fa		colonization (r						
	transient.		high end of sc	ale).					
SCORE	20 19	18 17 16		13 12 11	10 9 8 7	6	5		1 0
2 - F 11. 1		le, and boulder	Gravel, cobble		Gravel, cobble, and both particles are 50-75%	ılder		cobble, and lare are more the	
2. Embeddedness	particles are (	0-25% y fine sediment.	particles are 2:	5-50% fine sediment.	surrounded by fine sed	iment.		led by fine so	
	Layering of c	cobble provides	Jan Touridea by	Journaliti	The sea			J 0	
	diversity of n	iche space.							
SCORE	20 19	18 17 16		13 12 11		6	_	4 3 2	1 0
	All four veloc		Only 3 of the		Only 2 of the 4 habitat		Dominat		_
3. Velocity/Depth		ent (slow-deep, , fast-deep, fast-	present (if fast missing, score		regimes present (if fast shallow or slow shallow		velocity/	depth regim	E.
Regime	shallow. Deep		missing, score		missing, score loy	n aic			
SCORE	20 19	18 17 16		13 12 11	10 9 8 7	6	5	4 3 2	1 0

SCORE 5. Channel Flow Status  SCORE 6. Channel Alteration  SCORE 7 Frequency of Riffles	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.  20 19 18 17 16  Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.  20 19 18 17 16  Channelization or dredging absent or minimal; stream with normal pattern.  20 19 18 17 16  Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.  15 14 13 12 11  Water fills > 75% of the available channel; or <25% of channel substrate is exposed.  15 14 13 12 11  Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.  15 14 13 12 11  Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.  10 9 8 7 6  Water fills 25-75% of the available channel, and/or riffle substrates are mostly extrosec.  10 9 8 7 6  Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.  10 9 8 7 6  Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.  5 4 3 2 1 0  Very little water in channel and mostly present as standing pools.  5 4 3 2 1 0  Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.  5 4 3 2 1 0  Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.		
SCORE 5. Channel Flow Status  SCORE 6. Channel Alteration  SCORE 7 Frequency of Riffles	than 5% of the bottom affected by sediment deposition.  20 19 18 17 16  Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.  20 19 18 17 16  Channelization or dredging absent or minimal; stream with normal pattern.  20 19 18 17 16  Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.  15 14 13 12 11  Water fills > 75% of the available channel; or <25% of channel substrate is exposed.  15 14 13 12 11  Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.  15 14 13 12 11  Occurrence of riffles infrequent; distance between riffles divided by stream	on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.  10 9 8 7 6  Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.  10 9 8 7 6  Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.  10 9 8 7 6  Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15	development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.  5 4 3 2 1 0  Very little water in channel and mostly present as standing pools.  5 4 3 2 1 0  Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.  5 4 3 2 1 0  Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is >		
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	are important.		to 25.			
	1			1		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,		
	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along		
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;		
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-		
	affected.	areas of erosion.		100% of bank has erosional		
SCORE	Left Bank 10 9	8 7 6	5 4 3	scars. 2 1 0		
(LB)	Left Bank 10 9		3 4 3			
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9		3 4 3	2 1 0		
(RB)	M 41 - 000( - 641 -	70-90% of the streambank	50-70% of the streambank	Less than 50% of the		
9. Vegetative	More than 90% of the		surfaces covered by	streambank surfaces covered		
Protection (score each bank)	streambank surfaces and immediate riparian zone	surfaces covered by native vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of		
(Score each bank)	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is		
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has		
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5		
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble	centimeters or less in average		
	disruption through grazing or	great extent; more than one-	height remaining.	stubble height.		
	mowing minimal or not	half of the potential plant				
	evident; almost all plants	stubble height remaining.				
	allowed to grow naturally.					
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
(LB)						
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
(RB)						
10. Riparian Vegetative	Width of riparian zone > 18	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6		
Zone Width (score	meters; human activities (i.e.,	meters; human activities have	meters; human activities have			
each bank riparian	parking lots, roadbeds, clear-	impacted zone only	impacted zone a great deal.	vegetation due to human		
zone).	cuts, lawns, or crops) have not	minimally.		activities.		
20000	impacted zone			+		
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
(LB)						
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
(RB)			<u> </u>	<u> </u>		

	Reach 3C				-		
STREAM NAME:	<del></del>		LOCA	ATION:	Vontuele. D:	van Ala	rth Fork KY River)
STATION:	DRAINAGE	E AREA (AC) -	BASI	N/WATERSHE	-	ver (NO)	
LAT:	LONG:		COL	NTY; -Bi	reathitt USGS 7.5 TC	PO:	-Jackson
-10/25/06	EOITG.		-   -	-Di	- Rob Lewis, Juli		
DATE:		_ ☑ AM □F		ESTIGATORS;			
TYPE SAMPLE: □ P-C		1acroinvertebrate	□ FISH [		* * 41 . 1 . 67 1 . 6		
WEATHER: Nov		4 hours	Has there  ☐Yes	been a heavy  ☑No	rain in the last 7 days?	•	
		avy rain ady rain	Air temper		°F. Inches raint	all in na	ast 24 hours 0 in
	□ Inte	ermittent showers	10 %	Cloud Cover		p.	
☑		ar/sunny					
P-Chem: Temp (°F)	47 D.O. (	(mg/l) '	% Saturation	pH(S	S.U.) Cond.	23	6 □ Grab
INSTREAM WATERSH	ED						
FEATURES Stream Width 2	_	OCAL WATERS redominant Surrou					
Stream Width 2 Range of Depth 0.1-0	6 A D	Surface Mining	Ţ	e: Construct	ion 🗹 Fores	Ì	
Range of Depth Average Velocity	ft/s	Deep Mining	,	□ Commerc			ng
Discharge	cfs   🗆	l Oil Wells		☐ Industrial			
Est. Reach Length		l Land Disposal	(mining?)	□ Row Crop	os 🗖 Urbar	Runoff	f/Storm Sewers
Hydraulic Structures:	L	Str	ream Flow;	· · · · · · · · · · · · · · · · · · ·	St	ream Ty	ype;
Dams D	Bridge Abutr	ments 🗖 Dry	□ Poole		☑ Normal	Perer	nnial
□ Island □	Waterfalls	☐ Hig	h 🛭 Very	Rapid or Torrer	ntial $\square$	Ephe	emeral   Seep
	Culverts						
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove			nel Alterations;
Dominate Type:  ☑ Trees ☑	Shrubs	Domicad			posed (0-25%) Exposed (25-50%)		Oredging Channelization
	Snrubs Herbaceous	Dogwood Honeysuckle			Shaded (50-75%)		☐ Full ☐ Partial)
Number of Strata 3		White Oak			aded (75-100%)	``	,
	<del></del>				·		
Substrate ☑ Est. □	P.C	Riffle 20	)%	Run;	%	Pool	80%
Silt/Clay (<0.06 mm)		40	<u> </u>				60
Sand (0.06-2 mm)		20	)				20
Gravel (2-64 mm)		20		<b></b>			20
Cobble (64-256 mm)		20	)			·	
Boulders (>256 mm) Bedrock						<del> </del>	
Habitat				Condition	Category	L	
Parameter		ptimal		ptimal	Marginal		Poor
1 F=161		70% of substrate	1	f stable habitat;	20-40% mix of stable habitat availability less t		Less than 20-% stable habitat" lack of habitat is
1. Epifaunal Substrate/	favorable for colonization a	epitaunal and fish cover;	well suited for colonization p		desirable; substrate	11811	obvious; substrate unstable or
Available	mix of snags,	submerged logs,	adequate habit	at for	frequently disturbed or		lacking.
Cover	undercut bank	ks, cobble or	maintenance o	f populations;	removed.		
	other stable h	abitat and at value full colonization	presence of ad substrate in the				
	, ,	, logs/snags that	fall, but not ye				
	are not new fa		colonization (1	may rate at			
66077	transient.	10 17 17	high end of sc		10 0 0 7		E 4 2 3 1 0
SCORE	20 19	18 17 16 le, and boulder	15 14 Gravel, cobble	13 12 11	10 9 8 7 Gravel, cobble, and bou	6	5 4 3 2 1 0 Gravel, cobble, and boulder
2. Embeddedness	particles are		particles are 2		particles are 50-75%	iuci	particles are more than 75%
	surrounded by	y fine sediment.		fine sediment.	surrounded by fine sedin	nent.	surrounded by fine sediment.
		cobble provides					
SCORE	diversity of n	18 17 16	15 14	13 12 11	10 9 8 7	6	4 3 2 1 0
SCORE	All four veloc		Only 3 of the		Only 2 of the 4 habitat	+	Dominated by 1
3. Velocity/Depth		ent (slow-deep,	present (if fast		regimes present (if fast-	ļ	velocity/depth regime.
Regime	slow-shallow	, fast-deep, fast-	missing, score	lower than if	shallow or slow shallow	are	•
CCODE	shallow. Deep		missing other		mi sing score low) 10 9 8 7	6	5 4 3 2 1 0
SCORE	20 19	18 17 16	15 14	13 12 11	10/9 8 7	υ	3 4 3 4 I V

				Hann dan site of fine		
	Little or no enlargement of	Some new increase in bar	Moderate deposition of new gravel, sand or fine sediment	Heavy deposits of fine material, increased bar		
	islands or point bars and less than 5% of the bottom affected	formation, mostly from gravel, sand or fine sediment;	on old and new bars; 30-50%	development; more than 50%		
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing		
	by seament deposition.	affected; slight deposition in	sediment deposits at	frequently; pools almost		
		pools.	obstructions, constrictions,	absent due to substantial		
		poolei	and bends; moderate	sediment deposition.		
ĺ			deposition of pools prevalent.	·		
SCORE	20 19 18 17 16	15 14 13 12 11	16 9 8 7 6	5 4 3 2 1 0		
5. Channel Flow Status	Water reaches base of both	Water fills > 75% of the	Water fills 25-75% of the	Very little water in channel		
	lower banks, and minimal	available channel; or <25%	available channel, and/or	and mostly present as		
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.		
	exposed.	exposed.	exposed.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
6. Channel Alteration	Channelization or dreuging	Some channelization present,	Channelization may be	Banks shored with gabion of		
	absent or minimal; stream with	usually in areas of bridge	extensive; embankments or	cement; over 80% of the		
	normal pattern.	abutments; evidence of past	shoring structures present on	stream reach channelized and		
		channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat		
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed		
		be present, but recent	disrupted.	entirely.		
SCODE	20 10 19 17 17	nam elization is not present.	10 9 8 7 6	5 4 3 2 1 0		
SCORE 7 Fraguency of Piffles	20 19 18 17 16  Occurrence of riffles relatively	15 14 13 12 11 Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or		
7 Frequency of Riffles	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;		
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles		
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >		
	streams where riffles are		stream width is between 15	than 25.		
	continuous, boulders or logs		to 25.			
	are important.					
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,		
-	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along		
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;		
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-		
	affected.	areas of erosion.		100% of bank has erosional		
SCORE	Left Bank 10 9	8 7 6	5 4 3	scars. 2 1 0		
(LB)	Left Ballk 10 3					
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
(RB)						
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the		
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered		
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of		
	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is		
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has		
İ	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5		
İ	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble	centimeters or less in average		
	disruption through grazing or	great extent; more than one-	height remaining.	stubble height.		
i	mowing minimal or not	half of the potential plant stubble height remaining.		}		
	evident; almost all plants allowed to grow naturally.	studdle neight remaining.				
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
(LB)	Deit Duite 10					
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
(RB)						
10. Riparian Vegetative	Width of riparian zone > 18	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6		
TO. KIDAHAH VEREIMIVE	meters; human activities (i.e.,	meters; human activities have	meters; human activities have	meters; little or no riparian		
	Hieleis, Hullian activities (i.e.,		impacted zone a great deal.	vegetation due to human		
Zone Width (score		impacted zone only	impacted zone a great deal.	vegetation due to naman		
	parking lots, roadbeds, clear- cuts, lawns, or crops) have not	impacted zone only minimally.	impacted zone a great dear.	activities.		
Zone Width (score each bank riparian	parking lots, roadbeds, clear-		impacted zone a great deal.	activities.		
Zone Width (score each bank riparian	parking lots, roadbeds, clear- cuts, lawns, or crops) have not		5 <b>4</b> 3			
Zone Width (score each bank riparian zone).	parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone	minimally.		activities.		
Zone Width (score each bank riparian zone).	parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone	minimally.		activities.		

	Reach 3D			CATION:	•		
STREAM NAME:			LO	CATION:	- Kentucky Ri	ver (No	rth Fork KY River)
STATION:	DRAINAGE	E AREA (AC) -	BA	SIN/WATERSHE			
LAT:	LONG:		$ _{co}$	UNTY; -Bi	reathitt USGS 7.5 TC	PO;	-Jackson
-10/25/06				· · · · · · · · · · · · · · · · · · ·	- Rob Lewis, Julie		
DATE:	TIME:	more and a second		VESTIGATORS;			
TYPE SAMPLE: ☐ P-C WEATHER: Nov		1acroinvertebrate 4 hours		BACT.	rain in the last 7 days?	)	
WEATHER: NOV		avy rain	□Yes	Te been a neavy ☑No	raili ili tile iast / days:		
		ady rain		perature 30	°C. Inches raint	fall in p	ast 24 hours 0 in
	□ Inte	ermittent showers		% Cloud Cover	_		
<u>M</u>		ar/sunny	0/ 0 / /	.11/0		1.6	52
		(mg/1)	% Saturation	pn(s	S.U.) Cond.		- U Grau
INSTREAM WATERSH FEATURES		OCAL WATERS	HED FEAT	HRES:			
Stream Width 3	ft Pr	redominant Surrou					
Range of Depth 0.1-0	0.3 ft 🗆	Surface Mining		☐ Construct			
Average Velocity	ft/s │ □	Deep Mining		☐ Commerc			ing
Discharge		Oil Wells		☐ Industrial ☐ Row Cror			f/Storm Sewers
Est. Reach Length	<u> </u>	Land Disposal		☐ Row Crop			
Hydraulic Structures:			ream Flow;			ream T	
	Bridge Abutr Waterfalls	nents 🗖 Dry		oled   Low ry Rapid or Torrer		Pere Ephe	
☐ Island ☐ ☐ Other ☑	Culverts	L Hig	n 🗀 ve	ry Kapid or Torrer	itiai 🗀	Ери	emerai 🗀 Seep
Riparian Vegetation:		Dom. Tree/Shru	h Tava	Canopy Cove		Chan	nel Alterations;
Dominate Type:		Dom. Tree/Sira	io rana	☐ Fully Ex	posed (0-25%)		Dredging
☑ Trees □	Shrubs	Beech		☐ Partially	Exposed (25-50%)		Channelization
1	Herbaceous	Sugar Maple			Shaded (50-75%)	(	( Full Partial)
Number of Strata 2	<u> </u>	Rubus sp.		☐ Fully Sh	aded (75-100%)		
Substrate ☑ Est. □	P.C	Riffle 30	%	Run;	30 %	Pool	40 %
Silt/Clay (<0.06 mm)		20	)		20		60
Sand (0.06-2 mm)		F (	<u> </u>		50		30
Gravel (2-64 mm) Cobble (64-256 mm)		30			50 30	<u> </u>	10
Boulders (>256 mm)		30	·		30		
Bedrock							
Habitat				Condition			
Parameter		ptimal		optimal	Marginal	hitat	Poor Less than 20-% stable
1. Epifaunal	Greater than favorable for	70% of substrate	40-70% mix well suited f	of stable habitat;	20-40% mix of stable ha		Less than 20-% stable habitat" lack of habitat is
Substrate/		and fish cover;	colonization	potential;	desirable; substrate		obvious; substrate unstable or
Available	mix of snags,	submerged logs,	adequate hal	bitat for	frequently disturbed or		lacking.
Cover	undercut bank other stable h		maintenance presence of	e of populations;	removed.		
		abitat and at full colonization		the form of new			
	potential (i.e.,	, logs/snags that	fall, but not	yet prepared for			
	are <u>not</u> new fa	all and not		(may rate at			
SCORE	transient.	18 17 16	high end of	13 12 11	10 9 8 7	6	5 4 3 2 1 0
JOHN		le, and boulder		ble, and boulder	Gravel, cobble, and bou		Gravel, cobble, and boulder
2. Embeddedness	particles are (	0-25%	particles are	25-50%	particles are 50-75%		particles are more than 75%
		y fine sediment.	surrounded	by fine sediment.	surrounded by fine sedir	nent.	surrounded by fine sediment.
	diversity of n	obble provides iche space.					
SCORE	20 19	18 17 16	15 14	13 12 11	9 8 7	6	5 4 3 2 1 0
	All four veloc			e 4 regimes	Only 2 of the 4 habitat		Dominated by I
3. Velocity/Depth	regimes prese	ent (slow-deep,		ast-shallow is	regimes present (if fast-		velocity/depth regime.
Regime	slow-shallow shallow. Deep	, fast-deep, fast-	missing, see missing oth	ore lower than if	shallow or slow shallow missing, score loy	are	
SCORE	20 19	18 17 16		13 12 11	10 9 8 7	6	5 4 3 2 1 0

4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine		
Deposition	islands or point bars and less	formation, mostly from	gravel, sand or fine sediment	material, increased bar		
	than 5% of the bottom affected	gravel, sand or fine sediment;	on old and new bars; 30-50%	development; more than 50%		
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing		
		affected; slight deposition in	sediment deposits at	frequently; pools almost		
		pools.	obstructions, constrictions,	absent due to substantial		
			and bends; moderate	sediment deposition.		
CCORE	20 10 10 15 16	15 14 15 13 11	deposition of pools prevalent.  10 9 8 7 6	F 4 3 3 1 0		
SCORE SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6 Water fills 25-75% of the	5 4 3 2 1 0		
5. Channel Flow Status	Water reaches base of both lower banks, and minimal	Water fills > 75% or the available channel; or <25%	available channel, and/or	Very little water in channel and mostly present as		
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.		
	exposed.	exposed.	expose .	standing pools.		
SCORE	20 19 18 17 16	15 14 13 12 11	1 9 8 7 6	5 4 3 2 1 0		
6. Channel Alteration	Channelization or dredging	Some channelization present,	Channelization may be	Banks shored with gabion of		
o. Channel Ancration	absent or minimal; stream with	usually in areas of bridge	extensive; embankments or	cement; over 80% of the		
	normal pattern.	abutments; evidence of past	shoring structures present on	stream reach channelized and		
	normar pattern.	channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat		
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed		
		be present, but recent	disrupted.	entirely.		
		channelization is not present.				
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
7 Frequency of Riffles	Occurrence of rutles relatively	Occurrence of riffles .	Occasional riffle or bend:	Generally all flat water or		
	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;		
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles		
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >		
	streams where riffles are		stream width is between 15	than 25.		
	continuous, boulders or logs		to 25.			
COORE	are important.		10 0 0 7	5 4 3 2 1 0		
SCORE	20 19 18 17 16  Banks stable; evidence of	15 14 13 12 11 Moderately stable,	10 9 8 7 6 Moderately unstable, 30-60%	Unstable, many eroded areas.		
8. Bank Stability	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along		
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;		
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-		
	affected.	areas of erosion.	potential daring noods.	100% of bank has erosional		
				scars.		
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
(LB)		$\boldsymbol{\succ}$				
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
(RB)	S					
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the		
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered		
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of		
	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is		
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has		
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5		
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble height remaining.	centimeters or less in average stubble height.		
	disruption through grazing or mowing minimal or not	great extent; more than one- half of the potential plant	neight femaning.	stubble height.		
	evident; almost all plants	stubble height remaining.				
	allowed to grow naturally.	Control of the second s				
SCORE	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0		
(LB)						
SCORE	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0		
(RB)						
10. Riparian Vegetative	Width of riparian zone > 18	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6		
Zone Width (score	meters; human activities (i.e.,	meters; human activities have	meters; human activities have	meters; little or no riparian		
each bank riparian	parking lots, roadbeds, clear-	impacted zone only	impacted zone a great deal.	vegetation due to human		
zone).	cuts, lawns, or crops) have not	minimally.		activities.		
	impacted zone					
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
(LB)	<b>X</b>			<u> </u>		
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0		

- F STREAM NAME:	Reach EPH.#2	(Fill Site #1)	1004	ATION:	•	-	
					•	ver (No	orth Fork KY River)
STATION:	DRAINAGE	AREA (AC) -	BASI	N/WATERSHE	D		-Jackson
LAT:	LONG:		сои	NTY; -Bi	reathitt USGS 7.5 TC		Julian
-10/05/04 DATE:	TIME:		M INVF	STIGATORS;	- Darren Parrent		
TYPE SAMPLE: □ P-C		lacroinvertebrate	☐ FISH □				
WEATHER: Nov		4 hours			rain in the last 7 days?	1	
		avy rain ady rain	□Yes Air temper	⊠No ature 70	°C. Inches rain	fall in n	past 24 hours 0 in
		ermittent showers			_ C. Inches rain	p	Mast 24 Hours III
₫	⊠Clea	ar/sunny					
P-Chem: Temp (°F)		mg/l)	% Saturation _	pH(S	.U.) Cond.	16	64 □ Grab
INSTREAM WATERSH FEATURES		OCAL WATERS	UED EEATHE	DEC.			
Stream Width 3		edominant Surrou					
Range of Depth 0	ft 🗆	Surface Mining		□ Constructi			
Average Velocity	ft/s 🗆	, .		□ Commerc			ing
Discharge Est. Reach Length	efs   □			☐ Industrial ☐ Row Crop			ff/Storm Sewers
		·		- Kow Crop			
Hydraulic Structures:  ☐ Dams ☐	Bridge Abutn		eam Flow;  Poole	d 🗖 Low		ream T Pere	
□ Island □	Waterfalls	nents 🖭 Dry		Rapid or Torrer			emeral
Other 🗆	Culverts			. 1		•	
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove			nel Alterations;
Dominate Type:	<b>.</b>	6 14 1			posed (0-25%)		Dredging Charaction
☑ Trees ☑ Grasses ☑	Shrubs Herbaceous	Sugar Maple Beech			Exposed (25-50%) Shaded (50-75%)		Channelization  ☐ Full ☐ Partial)
Number of Strata 3		Spicebush			aded (75-100%)	ľ	
	<del></del>				,		
Substrate ☑ Est. □	P.C	Riffle 33	3 %	Run;	33 %	Pool	33 %
Silt/Clay (<0.06 mm)		20			20		30
Sand (0.06-2 mm)							
Gravel (2-64 mm)		4(			40	-	40 30
Cobble (64-256 mm) Boulders (>256 mm)		40	)		40		30
Bedrock							
Habitat				Condition			
Parameter		otimal	Subor		Marginal 20-40% mix of stable ha	hitet	Poor Less than 20-% stable
1. Epifaunal	Greater than 7 favorable for o	70% of substrate	40-70% mix of well suited for	,	habitat availability less t		habitat" lack of habitat is
Substrate/	colonization a	and fish cover;	colonization po	otential;	desirable; substrate		obvious; substrate unstable or
Available		submerged logs,	adequate habita		frequently disturbed or		lacking.
Cover	undercut bank other stable ha		maintenance of add		removed.		
	1	full colonization	substrate in the	form of new			
	potential (i.e.,	logs/snags that	fall, but not ye	t prepared for			
	are <u>not</u> new fa transient.	all and not	colonization (n high end of sca				
SCORE	20 19	18 17 (16)		3 12 11	10 9 8 7	6	5 4 3 2 1 0
	Gravel, cobbl	e, and boulder	Gravel, cobble	, and boulder	Gravel, cobble, and bou	lder	Gravel, cobble, and boulder
2. Embeddedness	particles are 0		particles are 25		particles are 50-75%	nent	particles are more than 75% surrounded by fine sediment.
		y fine sediment. obble provides	surrounded by	ime sealment.	surrounded by fine sedin	nent.	surrounded by fine sediment.
	diversity of ni						
SCORE	20 19	18 17 16		13 12 11	10 9 8 7		5 4 3 2 1 0
2 7 1 1 7 1	All four veloc		Only 3 of the		Only 2 of the 4 habitat		Dominated by I velocity/depth regime.
3. Velocity/Depth Regime		ent (slow-deep, , fast-deep, fast-	present (if fast missing, score		regimes present (if fast- shallow or slow shallow	are	velocity/depth regime.
	shallow. Deep		missing other		missing, scare tow)		
SCORE	20 19	18 17 16	15 14	13 12 11		6	5 4 3 2 1 0

				II 1 ' CC
4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
Deposition	islands or point bars and less	formation, mostly from	gravel, sand or fine sediment	material, increased bar development; more than 50%
	than 5% of the bottom affected	gravel, sand or fine sediment;	on old and new bars; 30-50%	
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing frequently; pools almost
		affected; slight deposition in	sediment deposits at	absent due to substantial
		pools.	obstructions, constrictions, and bends; moderate	sediment deposition.
			deposition of pools prevalent.	sedificit deposition.
		17 14 13 13 11		5 4 3 2 1 0
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	Very little water in channel
5. Channel Flow Status	Water reaches base of both	Water fills > 75% of the	Water fills 25-75% of the	and mostly present as
	lower banks, and minimal	available channel; or <25%	available channel, and/or riffle substrates are mostly	standing pools.
	amount of channel substrate is	of channel substrate is	exposed.	standing pools.
00000	exposed.	exposed.	10 9 8 7 6	5 4 3 2 1 0
SCORE	20 19 18 17 16		Channelization may be	Banks shored with gabion of
6. Channel Alteration	Channelization or dredging	Some channelization present,	extensive; embankments or	cement; over 80% of the
	absent or minimal; stream with	usually in areas of bridge abutments; evidence of past	shoring structures present on	stream reach channelized and
	normal pattern.	channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed
		be present, but recent	disrupted.	entirely.
		channelization is not present.	disrupted.	onthery.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	20 19 18 17 16 Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or
7 Frequency of Riffles	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles
,	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >
	streams where riffles are	width is between 7 to 15.	stream width is between 15	than 25.
	continuous, boulders or logs		to 25.	
	are important.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,
o. Sam statem,	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-
	affected.	areas of erosion.	1	100% of bank has erosional
				scars.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)				
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	<b>-</b>		•	
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of
(27077 27077)		plants is not well-	obvious; patches of bare soil	streambank vegetation is
ì	covered by native vegetation,	plants is not wen-	obvious; patches of bare son	Streambank regetation is
	covered by native vegetation, including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has
	covered by native vegetation, including trees, understory shrubs, or nonwoody	1 1	or closely cropped vegetation common; less than one-half	very high; vegetation has been removed to 5
	including trees, understory shrubs, or nonwoody macrophytes; vegetative	represented; disruption evident but not affecting full plant growth potential to any	or closely cropped vegetation common; less than one-half of the potential plant stubble	very high; vegetation has been removed to 5 centimeters or less in average
	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-	or closely cropped vegetation common; less than one-half	very high; vegetation has been removed to 5
·	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant	or closely cropped vegetation common; less than one-half of the potential plant stubble	very high; vegetation has been removed to 5 centimeters or less in average
	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-	or closely cropped vegetation common; less than one-half of the potential plant stubble	very high; vegetation has been removed to 5 centimeters or less in average
	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant	or closely cropped vegetation common; less than one-half of the potential plant stubble	very high; vegetation has been removed to 5 centimeters or less in average
(LB)	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.
(LB) SCORE	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.
(LB) SCORE (RB)	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6 8 7 6	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  5 4 3	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0 2 1 0
(LB) SCORE	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  8 7 6  Width of riparian zone 12-18	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  5 4 3  Width of riparian zone 6-12	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e.,	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian
(LB) SCORE (RB) 10. Riparian Vegetative	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  5 4 3  Width of riparian zone 6-12	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone).	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone).	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
(LB) SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone). SCORE	including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.  Left Bank 10 9  Right Bank 10 9  Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.  8 7 6  Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.  5 4 3  Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	very high; vegetation has been removed to 5 centimeters or less in average stubble height.  2 1 0  2 1 0  Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.

_ ·	Reach 7.A		,	TION	-		
STREAM NAME:	<u> </u>	<del></del>	LOCA	ATION:	- Kentucky Riv	ver (North F	ork KY River)
STATION:	DRAINAGE	E AREA (AC) -	BASII	N/WATERSHE	•		ackson
LAT:	LONG:		COUN	NTY; -Bi	reathitt USGS 7.5 TO	PO;	
-10/26/06					- Rob Lewis, Julie		
DATE:		✓ AM □P		STIGATORS;			
TYPE SAMPLE: ☐ P-CI WEATHER: Now		1acroinvertebrate	☐ FISH ☐		rain in the last 7 days?		
WEATHER: NOW		avy rain	Has there □Yes	ØNo	rani ni ule iast / days!		
	☐ Ste	eady rain	Air temper	rature <u>32</u>	°C. Inches rainf	fall in past 24	4 hours <u>0</u> in
Ø	□ Inte	ermittent showers					
D.Chana Tama (9E)		ar/sunny	V Cotumetic	11/0	(11)	105	□ Grah
P-Chem: Temp (°F)		(mR\t)	/o Saturation _	pH(S	S.U.) Cond.	193	_ 0140
INSTREAM WATERSH FEATURES		OCAL WATERS	HED FEATUR	RES:			
Stream Width 3		redominant Surrou					
Range of Depth 0.1-0	<u>.4</u> ft □	Surface Mining	Į.	☐ Constructi			
Average Velocity	ft/s 🛮 🗖	Deep Mining		□ Commerc		re/Grazing	
Discharge		Oil Wells		☐ Industrial		ulture Runoff/Sto	rm Sewers
Est. Reach Length	□			□ Row Crop			in dewels
Hydraulic Structures:			ream Flow;			ream Type;	
Dams D	Bridge Abutn					Perennial Ephemera	
☐ Island ☐ ☐ Other ☐	Waterfalls Culverts	⊔ Hig	h 🗖 Very	Kapid or Forrei	nuai 🗆	Epnemer.	а и эсер
	Curvetts	Dom. Tree/Shrul	h Tava	Canopy Cove	·r·	Channel A	Iterations:
Riparian Vegetation: Dominate Type:		Dom. Tree/Shru	U I axa		er; sposed (0-25%)	□ Dredg	
	Shrubs	Yellow Poplar			Exposed (25-50%)		nelization
1	Herbaceous	Beech		☐ Partially	Shaded (50-75%)		Full   Partial)
Number of Strata 2		Golden Rod		☐ Fully Sh	naded (75-100%)		
	_			<u>L</u> _			
Substrate 🗹 Est. 🗆	P.C	Riffle 40	)%	Run;	%	Pool	60%
Silt/Clay (<0.06 mm)		20	)				20
Sand (0.06-2 mm)			,			<del>                                     </del>	10
Gravel (2-64 mm)		20		<del> </del>		<del> </del>	IV
Cobble (64-256 mm) Boulders (>256 mm)		10	,	1			
Bedrock		50	)	<u> </u>			70
Habitat				Condition			
Parameter		ptimal	Subor		Marginal 20 4000	Is in a second	Poor
1 Emiform -1		70% of substrate	40-70% mix of well suited for	f stable habitat;	20-40% mix of stable ha habitat availability less t		s than 20-% stable itat" lack of habitat is
1. Epifaunal Substrate/	favorable for colonization a	epitaunal and fish cover;	well suited for colonization po		desirable; substrate		ious; substrate unstable or
Available	mix of snags,	, submerged logs,	adequate habita	at for	frequently disturbed or	lack	,
Cover	undercut bank	ks, cobble or	maintenance of	f populations;	removed.		
	other stable h	nabitat and at v full colonization	presence of ad-		1		
		v full colonization ., logs/snags that	fall, but not ye				
	are not new fa		colonization (n	nay rate at			
SCORE	transient.	10	high end of sca		10 0 0 -		5)4 3 2 1 0
SCORE	Gravel cobbl	18 17 16 le, and boulder	15 14 1 Gravel, cobble	13 12 11 e and boulder	10 9 8 7 Gravel, cobble, and bou	6 der Gra	yel, cobble, and boulder
2. Embeddedness	particles are (		particles are 25		particles are 50-75%	part	ticles are more than 75%
	surrounded by	y fine sediment.	surrounded by		surrounded by fine sedir		ounded by fine sediment.
	Layering of c	cobble provides					
SCORE	diversity of n	18 17 16	15 14	13 12 11	10 9 7	6	5 4 3 2 1 0
DEUNE	All four veloc		Only 3 of the 4		Only 2 of the 4 habitat		ninated by 1
3. Velocity/Depth		ent (slow-deep,	present (if fast		regimes present (if fast-		ocity/depth regime.
Regime	slow-shallow	, fast-deep, fast-	missing, score	lower than if	shallow or slow shallow		<del>-</del>
CCORT	shallow. Deep		missing other		missing, score lov	k	5 4 3 2 1 0
SCORE	20 19	18 17 16	15 14	13 12 11	10 9 8 7	0	5 4 3 2 1 0

4 Cadimont	Little or no anlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
4. Sediment Deposition	Little or no enlargement of islands or point bars and less	formation, mostly from	gravel, sand or fine sediment	material, increased bar
Deposition	than 5% of the bottom affected	gravel, sand or fine sediment;	on old and new bars; 30-50%	development; more than 50%
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing
	by seament deposition.	affected; slight deposition in	sediment deposits at	frequently; pools almost
		pools.	obstructions, constrictions,	absent due to substantial
		,	and bends; moderate	sediment deposition.
			deposition of pools prevalent.	•
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both	Water fills > 75% of the	Water fills 25-75% of the	Very little water in channel
	lower banks, and minimal	available channel; or <25%	available channel, and/or	and mostly present as
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.
	exposed.	xpo.ed.	exposed.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging	Some channelization present,	Channelization may be	Banks shored with gabion of
	absent or minimal; stream with	usually in areas of bridge	extensive; embankments or	cement; over 80% of the
	normal pattern.	abutments; evidence of past	shoring structures present on	stream reach channelized and
		channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed
		be present, but recent	disrupted.	entirely.
		channelization is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10/9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or
	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >
	streams where riffles are		stream width is between 15	than 25.
	continuous, boulders or logs		to 25.	
ACORD .	are important.		10 0 0 7	5 4 2 2 1 0
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,
	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60- 100% of bank has erosional
	affected.	areas of erosion.		scar.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)				$\vdash$
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	1.18.10 2.11.11			
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of
,	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble	centimeters or less in average
	disruption through grazing or	great extent; more than one-	height remaining.	stubble height.
	mowing minimal or not	half of the potential plant		
	evident; almost all plants	stubble height remaining.		
CCOPP	allowed to grow naturally.			1 0
SCORE	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
(LB)				
SCORE (D.D.)	Right Bank 10 9	8 7 6	5 4 (3)	2 1 0
(RB)	Wild City Co.	W: 44 - C.:	Wildland Colonia	Width of singuish many of
10. Riparian Vegetative	Width of riparian zone > 18	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6 meters; little or no riparian
Zone Width (score	meters; human activities (i.e.,	meters; human activities have	meters; human activities have	
each bank riparian	parking lots, roadbeds, clear-	impacted zone only	impacted zone a great deal.	vegetation due to human activities.
zone).	cuts, lawns, or crops) have not impacted zone	minimally.		activities.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)	Leit Dank 10 9	, ,		
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)	Might Dalik 10 9	9 / 0		
(ND)		1		

- Reach 7B				LOCA	TION	-			
STREAM NAME:	Τ			LOCA'	HON:	- Ken	tucky Riv	ver (No	orth Fork KY River)
STATION:	DRAINAGE	E AREA (AC) -		BASIN	N/WATERSHE	•			
LAT:	LONG:			COUN	<u>'TY;</u> -Br	reathitt USG			
-10/26/06				- Rob Lewis, Julie Clark					
DATE:		Ø AM □F			STIGATORS;				
TYPE SAMPLE: □ P-CI WEATHER: Now		1acroinvertebrate 4 hours			BACT.	rain in the last	7 dave?		
WEATHER: NOW		avy rain			⊠No		_		
	□ Stea □ Inte	eady rain ermittent showers ar/sunny	Air t	tempera	ture <u>32</u>	°F. Inc	hes rainf	all in p	past 24 hours <u>0</u> in
P-Chem: Temp (°F)		(mg/l)	% Saturat	tion _	pH(S	.U.)	Cond.		95 Grab
INSTREAM WATERSH FEATURES Stream Width 6 Range of Depth 0.1-0. Average Velocity Discharge Est. Reach Length	ft Production ft/s Control ft/s	OCAL WATERS redominant Surrou Surface Mining Deep Mining Oil Wells Land Disposal	SHED FE Inding La	CATUR and Use:	ES:	ion ☑ ial □	Forest Pastur Silvic	re/Graz ulture	
Hydraulic Structures:  Dams Island Other	Bridge Abutn Waterfalls Culverts	ments 🗖 Dry		Pooled	d □ Low Rapid or Torren			ream T Pere Eph	
l .	Shrubs Herbaceous	Dom. Tree/Shru Sugar Maple Sycamore Slippery Elm	ib Taxa		<ul><li>☑ Partially</li><li>☐ Partially</li></ul>	r; posed (0-25%) Exposed (25-50 Shaded (50-75%) aded (75-100%)	<b>%</b> )		nel Alterations; Dredging Channelization (☑ Full □ Partial)
Substrate ☑ Est. □	P.C	Riffle70		6	Run;	%		Pool	
Silt/Clay (<0.06 mm)		10						<u> </u>	10
Sand (0.06-2 mm)		10						1	20 60
Gravel (2-64 mm) Cobble (64-256 mm)		30				4		<del> </del>	10
Boulders (>256 mm)		30							
Bedrock		1	<u></u>					L	
Habitat					Condition				
Parameter	Or	ptimal		Subop	timal	Marg			Poor
Epifaunal     Substrate/     Available     Cover	favorable for colonization a mix of snags, undercut bank other stable he stage to allow	and fish cover; , submerged logs, ks, cobble or labitat and at v full colonization , logs/snags that	well sui coloniza adequat mainten presence substrat fall, but	ited for fation por te habitanance of the of add te in the t not yet	tential; at for populations;	20-40% mix of habitat availabi desirable; subst frequently distu removed.	ility less t trate		Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	transient.	18 17 16	high e	d of scal	le).	10 9 8	8 7 (	6	5 4 3 2 1 0
SCORD		le, and boulder	Gravel,	cobble,	, and boulder	Gravel, cobble.	, and bou		Gravel, cobble, and boulder
2. Embeddedness	particles are ( surrounded by	0-25% by fine sediment. cobble provides	particle	s are 25		particles are 50 surrounded by	)-75%	į	particles are more than 75% surrounded by fine sediment.
SCORE	20 19	18 17 16	15	14 (1	13 12 11	10 9	8 7	6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four veloc regimes prese	city/depth ent (slow-deep, , fast-deep, fast-	Only 3 present missing missing	of the 4 (if fast- g, score l g other re	regimes -shallow is lower than if regimes)	Only 2 of the 4 regimes presen shallow or slow missing, so re	habitat it (if fast- v shallow low)	are	Dominated by 1 velocity/depth regime.
SCORE		18 17 16			13 12 11			6	5 4 3 2 1 0

4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
Deposition	islands or point bars and less	formation, mostly from	gravel, sand or fine sediment	material, increased bar
	than 5% of the bottom affected	gravel, sand or fine sediment;	on old and new bars; 30-50%	development; more than 50%
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing
		affected; slight deposition in	sediment deposits at	frequently; pools almost
		pools.	obstructions, constrictions,	absent due to substantial
			and bends; moderate	sediment deposition.
			deposition of pools prevalent.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both	Water fills > 75% of the	Water fills 23-75% of the	Very little water in channel
	lower banks, and minimal	available channel; or <25%	available channel, and/or	and mostly present as
	amount of channel substrate is	of channel substrate is	riffle substrates are mostly	standing pools.
CCOPP	exposed.	exposed.	exposed.	
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging	Some channelization present,	Channelization may be	Banks shored with gabion of
	absent or minimal; stream with	usually in areas of bridge	extensive; embankments or	cement; over 80% of the stream reach channelized and
	normal pattern.	abutments; evidence of past	shoring structures present on	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat
		(greater than past 20 yr.) may be present, but recent	stream reach channelized and disrupted.	greatly altered or removed entirely.
		channelization is not resent.	disrupted.	entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or
7 Frequency of Kirnes	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >
	streams where riffles are	width is between 7 to 15.	stream width is between 15	than 25.
	continuous, boulders or logs		to 25.	1
	are important.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,
•	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-
	affected.	areas of erosion.		100% of bank has erosional
				scars.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)				
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)				
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of
	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble height remaining.	centimeters or less in average stubble height.
	disruption through grazing or	great extent; more than one- half of the potential plant	neight remaining.	stubble height.
	mowing minimal or not evident; almost all plants	stubble height remaining.		
	allowed to grow naturally.	stabble neight remaining.		
SCORE	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
(LB)	Lett Bank 10	, ,		
SCORE	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
(RB)	Tright Zunk 10	"		
10. Riparian Vegetative	Width of riparian zone > 18	Width of riparian zone 12-18	Width of riparian zone 6-12	Width of riparian zone <6
Zone Width (score	meters; human activities (i.e.,	meters; human activities have	meters; human activities have	meters; little or no riparian
each bank riparian	parking lots, roadbeds, clear-	impacted zone only	impacted zone a great deal.	vegetation due to human
zone).	cuts, lawns, or crops) have not	minimally.		activities.
,	impacted zone	1		
SCORE	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
(LB)				
SCORE	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
(RB)				
\/	·	1		<u> </u>

STREAM NAME:	- Reach 7C				-			
STREAM INAME:				ATION:	•	ver (No	orth Fork KY River)	
STATION:	DRAINAGE	E AREA (AC) -	BASI	N/WATERSHE	ED		-Jackson	
LAT:	LONG:		COU	COUNTY; -Breathitt USGS 7.5 TOPO;				
-10/26/06	mis in		2017	- Rob Lewis, Julie Clark				
DATE:  TYPE SAMPLE: □ P-C	TIME:	☑ AM ☐I lacroinvertebrate	FISH D	STIGATORS;				
WEATHER: Nov		4 hours			rain in the last 7 days?	<del></del>		
		avy rain	□Yes	⊠No	ram m ene last / days.			
	☐ Ste	ady rain ermittent showers	Air temper	rature 32	°F. Inches raint	all in p	past 24 hours 0 in	
		ar/sunny						
P-Chem: Temp (°F)	48 D.O.	(mg/l)	% Saturation _	pH(S	S.U.) Cond.		91	
INSTREAM WATERSH								
FEATURES Stream Width 6	1 -	OCAL WATERS edominant Surrou						
Range of Depth $0.1-0$	ft   Pr .6 ft   □	Surface Mining		□ Construct	ion   Fores	i		
Average Velocity	ft/s	Deep Mining		☑ Commerc			zing	
Discharge		Oil Wells		☐ Industrial				
Est. Reach Length		Land Disposal		☐ Row Crop	ps 🗹 Urbar	Runo	ff/Storm Sewers	
Hydraulic Structures:		Str	ream Flow;		St	ream T	ype;	
Dams D	Bridge Abutr	nents 🛭 Dry	□ Poole		☑ Normal ☑	Per	ennial	
	Waterfalls	☐ Hig	h 🛭 Very	Rapid or Torre	ntial $\square$	Eph	nemeral	
□ Other ☑	Culverts							
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove			inel Alterations;	
Dominate Type:					sposed (0-25%)		Dredging	
☑ Trees ☑	Shrubs	White Pine			Exposed (25-50%)	1	Channelization	
☐ Grasses ☐ Number of Strata 2	Herbaceous	Sunflower sp.			Shaded (50-75%) naded (75-100%)		(☑ Full □ Partial)	
Number of Strata 2				La runy sii	iaded (75-10070)			
		T		ļ				
Substrate 🗹 Est. 🗆	P.C	Riffle 33	3%	Run;	33 %	Pool		
Silt/Clay (<0.06 mm)		2:			15	ļ	20	
Sand (0.06-2 mm)		25			15		20 40	
Gravel (2-64 mm) Cobble (64-256 mm)		25			30 40		20	
Boulders (>256 mm)		2.	)		40			
Bedrock								
Habitat		· · · · · · · · · · · · · · · · · · ·		Condition	Category			
Parameter		otimal	Subor	otimal	Marginal		Poor	
		70% of substrate	40-70% mix of		20-40% mix of stable ha		Less than 20-% stable	
1. Epifaunal Substrate/	favorable for	epifaunal and fish cover;	well suited for colonization po		habitat availability less t desirable; substrate	нап	habitat" lack of habitat is obvious; substrate unstable or	
Available		submerged logs,	adequate habita		frequently disturbed or	,	lacking.	
Cover	undercut bank	s, cobble or	maintenance of	f populations;	removed.			
	other stable h		presence of add					
		full colonization, logs/snags that	substrate in the fall, but not yet					
	are <u>not</u> new fa		colonization (n		_			
	transient.		high end of sca	ıle).				
SCORE	20 19	18 17 16		3 12 11		6	5 4 3 2 1 0	
2 5 1 11 1		e, and boulder	Gravel, cobble		Gravel, cobble, and bou	lder	Gravel, cobble, and boulder	
2. Embeddedness	particles are (	)-25% y fine sediment.	particles are 25 surrounded by		particles are 50-75% surrounded by fine seding	nent	particles are more than 75% surrounded by fine sediment.	
		obble provides	Surrounded by	and sequifile.	Surrounded by fine scull		Sarrounded by Time Southern.	
	diversity of n	iche space.						
SCORE	20 19	18 17 16		13 12 11	1	6	5 4 3 2 1 0	
	All four veloc		Only 3 of the 4		Only 2 of the 4 habitat		Dominated by 1	
3. Velocity/Depth		ent (slow-deep,	present (if fast- missing, score		regimes present (if fast- shallow or slow shallow	are	velocity/depth regime.	
Regime	slow-snallow shallow. Deep	, fast-deep, fast- o > 1.5 feet.	missing, score missing other r		missing, score low)	aic		
SCORE	20 19	18 17 16		13 12 11		6	5 4 3 2 1 0	

4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
Deposition	islands or point bars and less	formation, mostly from	gravel, sand or fine sediment	material, increased bar
	than 5% of the bottom affected	gravel, sand or fine sediment;	on old and new bars; 30-50%	development; more than 50%
	by sediment deposition.	5-30% of the bottom	of the bottom affected;	of the bottom changing
		affected; slight deposition in	sediment deposits at	frequently; pools almost absent due to substantial
		pools.	obstructions, constrictions, and bends: moderate	sediment deposition.
			deposition of pools prevalent.	sediment deposition.
SCODE	20 10 10 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
SCORE	20 19 18 17 16	15 14 13 12 11 Water fills > 75% of the	Water fills 25-75% of the	5 4 3 2 1 0  Very little water in channel
5. Channel Flow Status	Water reaches base of both		available channel, and/or	
	lower banks, and minimal amount of channel substrate is	available channel; or <25% of channel substrate is	riffle substrates are mostly	and mostly present as standing pools.
		** ************************************	exposed.	standing pools.
SCORE	exposed. 20 19 18 17 16	exposed.	10 9 8 7 6	5 4 3 2 1 0
			Channelization may be	Banks shored with gabion of
6. Channel Alteration	Channelization or dredging	Some channelization present, usually in areas of bridge	extensive; embankments or	cement; over 80% of the
	absent or minimal; stream with	abutments; evidence of past	shoring structures present on	stream reach channelized and
	normal pattern.	channelization, i.e., dredging,	both banks; and 40-80% of	disrupted. Instream habitat
		(greater than past 20 yr.) may	stream reach channelized and	greatly altered or removed
		be present, but recent	disrupted.	entirely.
		channelization is not present.		
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively	Occurrence of riffles	Occasional riffle or bend:	Generally all flat water or
, rrequency or remes	frequent; spacing between	infrequent; distance between	bottom contours provide	shallow riffles; poor habitat;
	riffles 5 to 7 stream widths.	riffles divided by stream	some habitat; distance	distance between riffles
	Variety of habitat is key. In	width is between 7 to 15.	between riffles divided by	divided by stream width is >
	streams where riffles are		stream width is between 15	than 25.
	continuous, boulders or logs		to 25.	
	are important.			
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of	Moderately stable,	Moderately unstable, 30-60%	Unstable, many eroded areas,
	erosion or bank failure absent	infrequent, small areas of	of bank in reach has areas of	"raw" areas frequently along
	or minimal; little potential for	erosion mostly healed over.	erosion, high erosion	straight sections and bends;
	future problems. <5% of bank	5-30% of bank in reach has	potential during floods.	obvious bank sloughing; 60-
	affected.	areas of erosion.		100% of bank has erosional
				scars.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)				
SCORE	Right Bank 10 9	8 7 6	5 4 3	. 2 1 0
(RB)		<u> </u>		
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection	streambank surfaces and	surfaces covered by native	surfaces covered by	streambank surfaces covered
(score each bank)	immediate riparian zone	vegetation, but one class of	vegetation; disruption	by vegetation; disruptive of
	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble	centimeters or less in average
	disruption through grazing or	great extent; more than one-	height remaining.	stubble height.
	mowing minimal or not	half of the potential plant		
	evident; almost all plants	stubble height remaining.		
SCORE	allowed to grow naturally.  Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
(LB)	Leit Dank 10 9	g / <b>v</b>		~ '
SCORE	Dight Ronly 10 0	8 7 6	5 (4) 3	2 1 0
(RB)	Right Bank 10 9	0 / 0		
	Width of ringuing games 10	Width of ringrian game 12 10	Width of riparian zone 6-12	Width of riparian zone <6
10. Riparian Vegetative	Width of riparian zone > 18 meters; human activities (i.e.,	Width of riparian zone 12-18 meters; human activities have	meters; human activities have	meters; little or no riparian
Zone Width (score each bank riparian	parking lots, roadbeds, clear-	impacted zone only	impacted zone a great deal.	vegetation due to human
	cuts, lawns, or crops) have not	minimally.	impacieu zone a great ucai.	activities.
zone).	impacted zone	minimany.		
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
	Leit Dank 10 9	, ,	7	
(LB)	1			
(LB)	Right Rank 10 0	8 7 6	5 4 3	2 (1) 0
(LB) SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

<u>-</u>	Reach 8A		LOCA	ATION:	-		
STREAM NAME:			LUCA	ATION:	- Kentucky Ri	ver (No	orth Fork KY River)
STATION:	DRAINAGE	E AREA (AC) -	BASI	N/WATERSHE			-Jackson
LAT:	LONG:		cour	NTY; -B			
-10/26/06	TUAE	- A) (	DIVE	- Rob Lewis, Julie Clark			
DATE:  TYPE SAMPLE: □ P-C	TIME: :	⊔ AM ២) Iacroinvertebrate		INVESTIGATORS; ISH D BACT.			
WEATHER: Nov		4 hours			rain in the last 7 days?	,	
		avy rain	□Yes	⊠No	·		
	□ Inte	ady rain ermittent showers	Air temper	rature 33 Cloud Cover	_ °F. Inches raint	àll in p	past 24 hours <u>0</u> in
P-Chem: Temp (°F)		ar/sunny (mg/l)	% Saturation	pH(S	S.U.) Cond.	1	20 □ Grab
INSTREAM WATERSH FEATURES Stream Width 3 Range of Depth Average Velocity	Stream Width       3       ft       Predominant Surrounding Land Use:         Range of Depth       0.1-0.3       ft       □ Surface Mining       □ Construction       ☑ Forest         Average Velocity       ft/s       □ Deep Mining       □ Commercial       ☑ Pasture/Grazing         Discharge       cfs       □ Oil Wells       □ Industrial       □ Silviculture						
Est. Reach Length		Land Disposal		□ Row Crop			
	Waterfalls	Sti ments		ed 🔲 Low Rapid or Torrer	✓ Normal		Type; ennial □ Intermittent nemeral □ Seep
	Shrubs Herbaceous	Dom. Tree/Shru White Pine Beech Paw paw	b Taxa	☐ Partially ☐ Partially	er; posed (0-25%) Exposed (25-50%) Shaded (50-75%) aded (75-100%)		nnel Alterations; Dredging Channelization (☑ Full □ Partial)
Substrate 🗹 Est. 🗆	P.C	Riffle30	)%	Run;	%	Pool	70 %
Silt/Clay (<0.06 mm)							
Sand (0.06-2 mm) Gravel (2-64 mm)	-	20				-	10 30
Cobble (64-256 mm)		30				ļ	20
Boulders (>256 mm)							
Bedrock		40	)				40
Habitat			T	Condition			
Parameter		otimal		otimal	Marginal	hitat.	Poor Less than 20-% stable
1. Epifaunal	Greater than favorable for	70% of substrate	40-70% mix of well suited for	f stable habitat; full	20-40% mix of stable ha		Less than 20-% stable habitat" lack of habitat is
Substrate/		and fish cover;	colonization pe		desirable; substrate		obvious; substrate unstable or
Available		submerged logs,	adequate habit		frequently disturbed or		lacking.
Cover	undercut bank other stable h	•	maintenance of ad		removed.		
		full colonization	substrate in the				
		, logs/snags that	fall, but not ye				
	are <u>not</u> new fa	all and <u>not</u>	colonization (r				
SCORE	transient. 20 19	18 17 16	high end of sca	3 12 11	10 9 8 7	<del>, )</del> –	5 4 3 2 1 0
SCORE		e, and boulder	Gravel, cobble		Gravel, cobble, and bou	der	Gravel, cobble, and boulder
2. Embeddedness	particles are (	)-25%	particles are 2:	5-50%	particles are 50-75%		particles are more than 75%
		y fine sediment.	surrounded by	fine sediment.	surrounded by fine sedir	nent.	surrounded by fine sediment.
	diversity of n	obble provides					
SCORE	20 19	18 17 16	15 14	13 12 11	10 9 8	6	5 4 3 2 1 0
	All four veloc		Only 3 of the		Only 2 of the 4 habitat		Dominated by I
3. Velocity/Depth	regimes prese	ent (slow-deep,	present (if fast	-shallow is	regimes present (if fast-		velocity/depth regime.
Regime		, fast-deep, fast-	missing, score		shallow or slow shallow missing, score low)	are	
SCORE	shallow. Deep	18 17 16	missing other 1	13 12 11		6	5 4 3 2 1 0

4. Sediment	Little or no enlargement of	Some new increase in bar formation, mostly from	Moderate deposition of new gravel, sand or fine sediment	Heavy deposits of fine material, increased bar
Deposition	islands or point bars and less than 5% of the bottom affected by sediment deposition.	gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in	on old and new bars; 30-50% of the bottom affected; sediment deposits at	development; more than 50% of the bottom changing frequently; pools almost
	·	pools.	obstructions, constrictions, and bends; moderate derosin on of pools prevalent.	absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	16 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the streambank surfaces covered
Protection (score each bank)	streambank surfaces and immediate riparian zone	surfaces covered by native vegetation, but one class of	surfaces covered by vegetation; disruption	by vegetation; disruptive of
(Score cach bank)	covered by native vegetation,	plants is not well-	obvious; patches of bare soil	streambank vegetation is
	including trees, understory	represented; disruption	or closely cropped vegetation	very high; vegetation has
	shrubs, or nonwoody	evident but not affecting full	common; less than one-half	been removed to 5
	macrophytes; vegetative	plant growth potential to any	of the potential plant stubble height remaining.	centimeters or less in average stubble height.
	disruption through grazing or mowing minimal or not	great extent; more than one- half of the potential plant	neight remaining.	Stubble height.
	evident; almost all plants allowed to grow naturally.	stubble height remaining.		
SCORE	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
(LB)		<b>×</b>		
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	impacted zone Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

- A STREAM NAME:	Reach 8B		1004	ATION:	*			
STREAM NAME.					•	iver (No	orth Fork KY River)	
STATION:	DRAINAGE	AREA (AC) -	BASI	N/WATERSHE	D		-Jackson	
LAT:	LONG:		COU	NTY; -Bi				
-10/26/06 DATE:	TIME:	□ AM ØP	M INVE	- Rob Lewis, Julie Clark INVESTIGATORS;				
TYPE SAMPLE:  P-C		Iacroinvertebrate	□ FISH □					
WEATHER: Nov	v Past 2	4 hours			rain in the last 7 days	?		
		avy rain	□Yes	ØNo	OF Imphas main	fa11 in m	east 24 hours () in	
		ady rain ermittent showers	Air temper	Tature	_ °F. Inches rain	iaii in p	past 24 hours <u>0</u> in	
	☑Cle	ar/sunny						
P-Chem: Temp (°F)	<i>51</i> D.O. (	(mg/l)	% Saturation _	pH(S	.U.) Cond.	_9	6 □ Grab	
INSTREAM WATERSH		OCAL WATERS	HED EEATH	orc.				
FEATURES Stream Width 5	ft Pr	edominant Surrou						
Range of Depth $0.1-0$	.4 ft   □	Surface Mining		☐ Construct				
Average Velocity	ft/s 🛮 🗆			□ Commerc			zing	
Discharge Est. Reach Length		Oil Wells Land Disposal		☐ Industrial ☐ Row Crop		culture	ff/Storm Sewers	
		-		L Kow Clop				
Hydraulic Structures:	Bridge Abutr		eam Flow;  Poole	od □ Lovy		tream T I Pere		
				Rapid or Torrer			nemeral	
Other □	Culverts			<b>F</b>		•	·	
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove			nnel Alterations;	
Dominate Type:	61 1	D .			posed (0-25%)		Dredging Channelization	
☑ Trees □ □ Grasses ☑	Shrubs Herbaceous	Beech Christmas fern			Exposed (25-50%) Shaded (50-75%)	1	Channelization (☐ Full ☐ Partial)	
Number of Strata 2		Curisimas jeru			aded (75-100%)		(	
_								
Substrate ☑ Est. □	P.C	Riffle 40	%	Run;	%	Pool	60%	
Silt/Clay (<0.06 mm)		20					40	
Sand (0.06-2 mm)							30	
Gravel (2-64 mm) Cobble (64-256 mm)		20		<u> </u>			30	
Boulders (>256 mm)		20				<b>+</b>		
Bedrock		A few poin	ts visible					
Habitat				Condition				
Parameter		ptimal		otimal f stable babitat:	Marginal	ahitat:	Poor Less than 20-% stable	
I. Epifaunal	Greater than favorable for	70% of substrate epifaunal	well suited for	f stable habitat; full	20-40% mix of stable h habitat availability less		habitat" lack of habitat is	
Substrate/	colonization a	and fish cover;	colonization po	otential;	desirable; substrate		obvious; substrate unstable or	
Available	mix of snags, undercut banl	submerged logs,	adequate habit maintenance o		frequently disturbed or removed.		lacking.	
Cover	other stable h		presence of ad		Temoved.			
	stage to allow	full colonization	substrate in the	e form of new				
	potential (i.e. are <u>not</u> new f	, logs/snags that	fall, but not ye colonization (r					
	transient.	un and <u>110t</u>	high end of sca					
SCORE	20 19	18 17 16		3 12 11		6	5 4 3 2 1 0	
2 Embaddadess		le, and boulder	Gravel, cobble particles are 2:		Gravel, cobble, and bot particles are 50-75%	ılder	Gravel, cobble, and boulder particles are more than 75%	
2. Embeddedness	particles are ( surrounded b	y fine sediment.	surrounded by		surrounded by fine sedi	ment.	surrounded by fine sediment.	
	Layering of c	obble provides						
SCORE	diversity of n	iche space.  18 17 16	14	13 12 11	10 9 8 7	6	5 4 3 2 1 0	
SCORE	All four velo		Only 3 of the		Only 2 of the 4 habitat		Dominated by I	
3. Velocity/Depth	regimes prese	ent (slow-deep,	present (if fast	-shallow is	regimes present (if fast		velocity/depth regime.	
Regime	slow-shallow	, fast-deep, fast-	missing, score		shallow or slow shallow	v are		
SCORE	shallow. Dee	p > 1.5 feet. 18 17 16	missing other	regimes) 13 12 11	missing, score low)	6	5 4 3 2 1 0	
SCORE	<u> </u>	10 1/ 10	15 14	19 14 11	10 7 0 /	U	J T J # 1 J	

4. Sediment	Little or no enlargement of	Some new increase in bar	Moderate deposition of new	Heavy deposits of fine
Deposition	islands or point bars and less than 5% of the bottom affected by sediment deposition.	formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions,	material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial
:			and bends; moderate deposition of pools prevalent.	sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% or the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative	More than 90% of the	70-90% of the streambank	50-70% of the streambank	Less than 50% of the
Protection (score each bank)	streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants	surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE	allowed to grow naturally.  Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)		$\boldsymbol{X}$		
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear- cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

- A	Reach 8C		1.004	ATION:	-			
						ver (No	orth Fork KY River)	
STATION:	DRAINAGE	AREA (AC) -	BASI	N/WATERSHE	.D		-Jackson	
LAT:	LONG:		COU	COUNTY; -Breathitt USGS 7.5 TOPO;				
-10/26/06	TIME:	□ AM ☑P	M INVE	STIGATORS;	- Rob Lewis, Julio	e Clark		
DATE:  TYPE SAMPLE: □ P-C		□ AM ☑P acroinvertebrate	□ FISH □					
WEATHER: Nov		4 hours			rain in the last 7 days?	,		
		avy rain	□Yes	⊠No	·			
		ady rain	Air temper		°F. Inches rainf	all in p	past 24 hours 0 in	
		ermittent showers ar/sunny		cloud Cover				
			% Saturation _	pH(S	.U.) Cond.		05 🗖 Grab	
INSTREAM WATERSH								
FEATURES	LC	OCAL WATERS						
Stream Width 4		edominant Surrou		_	ion 🗹 Forest			
Range of Depth $0-0$ . Average Velocity	.5 ft 0	Surface Mining Deep Mining	,	☐ Construct			ring	
Discharge		Oil Wells		☐ Industrial			8	
Est. Reach Length		Land Disposal		□ Row Crop		Runo	ff/Storm Sewers	
_		· · · · · · · · · · · · · · · · · · ·	eam Flow;		C+	ream T	vne:	
Hydraulic Structures:  ☐ Dams ☐	Bridge Abutn		eam Flow;	d 🗖 Low		Pere		
	Waterfalls			Rapid or Torrer			emeral   Seep	
□ Other □	Culverts	_		-				
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove			nel Alterations;	
Dominate Type:					posed (0-25%)		Dredging Channelization	
☐ Trees ☐ Grasses ☐	Shrubs Herbaceous	Beech Yellow Poplar			Exposed (25-50%) Shaded (50-75%)	1	( Full Partial)	
Number of Strata 3		Sugar Maple			aded (75-100%)		(La run La runus)	
- Trainiber of Strata	······································	Sugar mapre			,			
		D.00 #6	2/	D.	20 6/	Daal	20 %	
Substrate ☑ Est. ☐ Silt/Clay (<0.06 mm)	P.C	Riffle		Run;	10 %	Pool	20 76	
Sand (0.06-2 mm)		20			20	-	30	
Gravel (2-64 mm)		30			30		40	
Cobble (64-256 mm)		30	)		30		10	
Boulders (>256 mm)					10	<b> </b> -		
Bedrock Habitat		10	)	Condition	10 Cetegory			
Parameter Parameter	<u></u>	otimal	Subo	<u>Condition</u> ptimal	Marginal		Poor	
1 MI MINISTEL		70% of substrate	40-70% mix o	f stable habitat;	20-40% mix of stable ha		Less than 20-% stable	
1. Epifaunal	favorable for	epifaunal	well suited for		habitat availability less t	han	habitat" lack of habitat is obvious; substrate unstable or	
Substrate/ Available	colonization a	and fish cover; submerged logs,	colonization padequate habit		desirable; substrate frequently disturbed or		lacking.	
Cover	undercut bank		maintenance o	f populations;	removed.			
	other stable h	abitat and at	presence of ad	ditional				
		full colonization, logs/snags that	substrate in the fall, but not ye					
	are not new fa		colonization (1					
	transient.		high end or sc	ale).				
SCORE	20 19	18 17 16		3 12 11		6	Gravel, cobble, and boulder	
2. Embeddedness	Gravel, cobbl	le, and boulder	Gravel, cobble particles are 2		Gravel, cobble, and bou particles are 50-75%	iaer	particles are more than 75%	
2. Embeddediless		y fine sediment.		fine sediment.	surrounded by fine sedi	ment.	surrounded by fine sediment.	
	Layering of c	obble provides	1		_			
COORE	diversity of n		15 14	12 10 11	10 68 7	6	5 4 3 2 1 0	
SCORE	20 19	18 17 16	15 14 Only 3 of the	13 12 11	10 9 8 7 Only 2 of the 4 habitat	·	Dominated by 1	
3. Velocity/Depth	All four veloc	city/deptn ent (slow-deep,	present (if fast		regimes present (if fast-		velocity/depth regime.	
Regime	slow-shallow	, fast-deep, fast-	missing, score	lower than if	shallow or slow shallow			
96000	shallow. Dee		missing other		missing, score low)		E 4 2 2 1 0	
SCORE	20 19	18 17 16	15 14	13 12 11	10 9 8 7	6	5 4 3 2 1 0	

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	15 14 13 12 11 Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	10 9 8 7 6 Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent namelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
(RB)	Tright Dame 19			
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE	Left Bank 10 9	8 7 6	5 4 3	2 1 0
(LB)			F 4 3	2 1 0
SCORE (P.D.)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
(RB)  10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

D	each 8D	111811			•		
STREAM NAME:	acti ov		LOC	ATION:			
						ver (North	n Fork KY River)
STATION:	DRAINAGE A	AREA (AC) -	BAS	IN/WATERSHE	D		T
7. A.W.	LONG		COL	NITV. D.	reathitt USGS 7.5 TC		-Jackson
LAT:	LONG:		100	-Br	-		
DATE:	TIME:		M INV	ESTIGATORS;			
TYPE SAMPLE: P-CH		croinvertebrate					
WEATHER: Now					rain in the last 7 days?		
	☐ Heav	y rain		□No			
	☐ Stead	dy rain	Air tempe	erature	°F. Inches rainf	all in past	24 hours $\theta$ in
		mittent showers		Cloud Cover			
		/sunny					<b>5</b> 0 1
P-Chem: Temp (°F)	<u>60</u> D.O. (m	ng/l)'	% Saturation	pH(S	.U.) Cond.	96	Grab
INSTREAM WATERSHI	ED						
FEATURES		CAL WATERS					
Stream Width 7		dominant Surrou	_		<b>-</b>		
Range of Depth 0.1-0.	4 ft	Surface Mining	5	☐ Constructi			<b>Y</b>
Average Velocity		Deep Mining Oil Wells		☐ Industrial			3
Discharge Est. Reach Length		Land Disposal					Storm Sewers
Lat. Reach Length							
Hydraulic Structures:			eam Flow;			ream Typ	
	Bridge Abutme	ents Dry	☐ Pool	led ☑ Low		Perenn Ephem	
	Waterfalls Culverts	⊔ Hig	n 🗀 very	Rapid or Torrer	ıtıar 🗅	Ерпеп	істаї 🗀 Зеер
						Character	1 Altonotiona
Riparian Vegetation:		Dom. Tree/Shru	b Taxa	Canopy Cove	r; posed (0-25%)	D Dr	l Alterations;
Dominate Type: ☐ Trees ☐	Shrubs				Exposed (25-50%)		annelization
	Herbaceous				Shaded (50-75%)		Full   Partial)
Number of Strata					aded (75-100%)		
	<del></del>						
	7.0	D:00	Δ/	D	0/	Pool	100 %
	P.C	Riffle	%	Kun;	<u>%</u>	1 001	
Silt/Clay (<0.06 mm)							100
Sand (0.06-2 mm)						<del> </del>	
Gravel (2-64 mm) Cobble (64-256 mm)							
Boulders (>256 mm)							
Bedrock							
Habitat				Condition			
Parameter		imal		optimal	Marginal		Poor
	Greater than 70			of stable habitat;	20-40% mix of stable h		ess than 20-% stable abitat" lack of habitat is
1. Epifaunal Substrate/	favorable for ep colonization an		well suited for colonization		habitat availability less desirable; substrate		bvious; substrate unstable or
Available		ubmerged logs,	adequate hab		frequently disturbed or	1 .	acking.
Cover	undercut banks		maintenance	of populations;	removed.		
	other stable hab		presence of a				
		full colonization		he form of new			
	potential (i.e., l are not new fal		colonization	et prepared for (may rate at			
	transient.		high end of s				
SCORE	20 19	18 17 16	15 14	13 12 11		6	5 4 3 2 1 0
	Gravel, cobble.			le, and boulder	Gravel, cobble, and bou		Gravel, cobble, and boulder
2. Embeddedness	particles are 0-		particles are	25-50% by fine sediment.	particles are 50-75% surrounded by fine sedi		particles are more than 75% surrounded by fine sediment.
	surrounded by Layering of col		Surrounded b	y mie seument.	Surrounded by fine sedi		an Juneau of The Journalie
	diversity of nic						
SCORE		18 17 16	15 14	13 12	10 9 8 7	6	5 4 3 2 1 0
	All four veloci	ty/depth	Only 3 of the		Only 2 of the 4 habitat		Dominated by 1
3. Velocity/Depth	regimes presen	nt (slow-deep,	present (if fa		regimes present (if fast-		elocity/depth regime.
Regime		fast-deep, fast-		re lower than if	shallow or slow shallow mi_sing_score low)	v are	
SCORE	shallow. Deep	> 1.5 feet. 18 17 16	missing othe			6	5 4 3 2 1 0
SCORE	4U 17	10 1/ 10	13 14	10 14 11	1 3 7 8 7	<del>-</del>	

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 5. Channel Flow Status	20 19 18 17 16  Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	15 14 13 12 11 Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	deposition of pools provatest.  10 9 8 7 6  Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	5 4 3 2 1 0  Very little water in channel and mostly present as standing pools.
SCORE 6. Channel Alteration	20 19 18 17 16  Channelization or dredging absent or minimal; stream with normal pattern.	15 14 13 12 11  Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent name elization is not present.	10 9 8 7 6  Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gapion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 7 Frequency of Riffles	20 19 18 17 16  Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	15 14 13 12 11 Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	10 9 8 7 6 Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	5 4 3 2 1 0 Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE 8. Bank Stability	20 19 18 17 16  Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	15 14 13 12 11  Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	10 9 8 7 6  Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	5 4 3 2 1 0 Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0



ΕII Model

> Variables Measure Units

## Enter quantitative or categorical measure from Field Data Sheet in shaded cells **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status

- 6. Channel Alteration 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

/	jno units
5	no units
5	no units
10	no units
18	no units
11	no units
5	no units
12	no units
10	no units
10	no units



**Total Habitat Score** no units

## Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled

- % Mayflies (0-100) 0 % Midges & Worms (0-100)
- no units

NA



# Ell Calculation for High Gradient Streams in Eastern Kentucky Coalfield (Version 2002.6) \*\*(Family Level Taxonomy - All Habitats)\*\*



ΕII Model

Measure

Units

Variables Enter quantitative or categorical measure from Field Data Sheet in shaded cells

## **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined) 10. Riparian Width (both combined)

10	no units
8	no units
7	no units
11	no units
10	no units
17	no units
12	no units
14	no units
16	no units
18	no units



**Total Habitat Score** 123 no units

## Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled
0	% Mayflies (0-100)
0	% Midges & Worms (0-100
0	no units

NA





Variables Measure Units

#### Enter quantitative or categorical measure from Field Data Sheet in shaded cells **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined) 10. Riparian Width (both combined)

11	no units
4	no units
10	no units
9	no units
17	no units
15	no units
12	no units
17	no units
16	no units
12	no units



Total Habitat Score	123	no units
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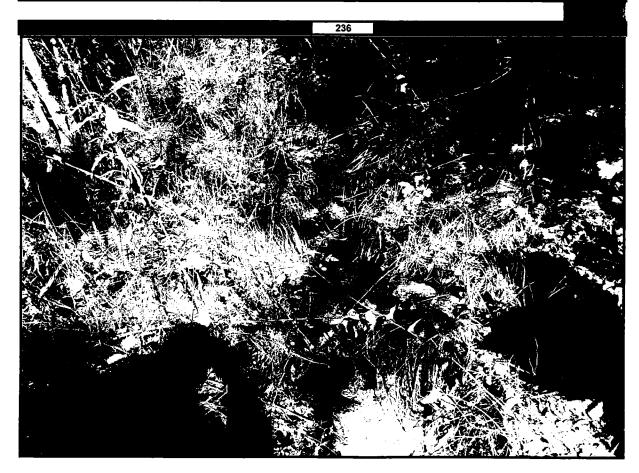
#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
. 0	# of EPT species samp
0	% Mavflies (0-100)

- % Midges & Worms (0-100)

NA





Εii Model

> Variables Units

#### Enter quantitative or categorical measure from Field Data Sheet in shaded cells

- **RBP Habitat Parameters**
- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
  8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

12	no units
10	no units
7	no units
12	no units
9	no units
18	no units
15	no units
12	no units
14	no units
18	no units

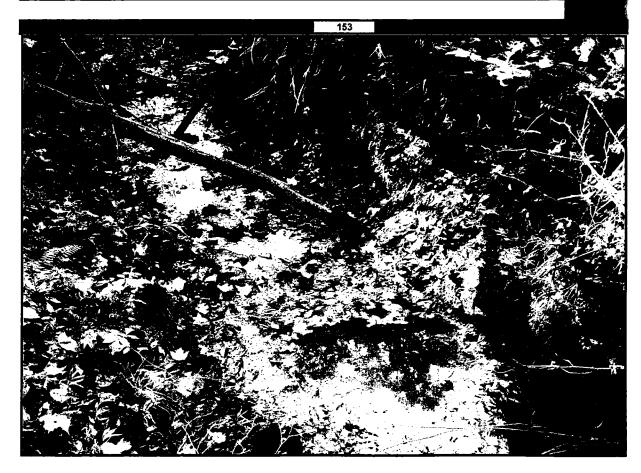


Total Habitat Score	127	no units

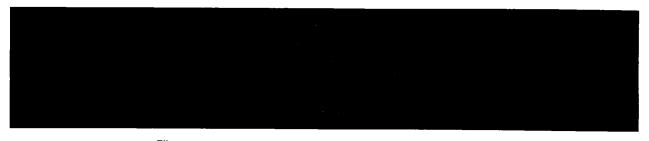
#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled
0	% Mayflies (0-100)
0	% Midges & Worms (0-100)
0	no units



# Ell Calculation for High Gradient Streams in Eastern Kentucky Coalfield (Version 2002.6) \*\*(Family Level Taxonomy - All Habitats)\*\*



ΕII Model

> **Variables** Measure

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- Velocity/Depth Regime
   Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

16	no units
6	no units
8	no units
5	no units
0	no units
16	no units
16	no units
16	no units
14	no units
20	no units





Total Habitat Score	117	no units
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# <u>Macroinvertebrate Data - Family Level (All Habitats)</u> 11. Family Taxa Richness

- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled
0	% Mayflies (0-100)
0	% Midges & Worms (0-100
0	no units





Variables Measure Units

#### Enter quantitative or categorical measure from Field Data Sheet in shaded cells **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
  10. Riparian Width (both combined)

5	no units
8	no units
7	no units
10	no units
15	no units
10	no units
11	no units
4	no units
6	no units
2	no units



Total Habitat Score no units

#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled
0	% Mayflies (0-100)
0	% Midges & Worms (0-100
0	no units





ΕII Model

> Variables Measure

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends) 8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

14	no units
13	no units
8	no units
8	no units
18	no units
12	no units
16	no units
12	no units
8	no units
6	no units



**Total Habitat Score** 115 no units

## Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
  14. % Chironomidae & Oligochaeta
- 15. mFBI

itt of touc compled	

- # of EPT species sampled
- % Mayfires (0-100) 0
  - % Midges & Worms (0-100) no units

NΑ





ΕII Model

Measure

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
  8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

8	no units
9	no units
9	no units
11	no units
18	no units
10	no units
8	no units
12	no units
8	no units
2	no units

Units



		,
Total Habitat Score	OF	
i otai nabitat Score	95	Ino units

## Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled

- # of EPT species sampled
- % Mayflies (0-100)
  - % Midges & Worms (0-100)
- 0 no units

NA





ΕIJ Model Variables

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
  9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

6	no units
7	no units
6	no units
10	no units
16	no units
9	no units
13	no units
9	no units
12	no units
10	no units

Measure

Units



**Total Habitat Score** 98 no units

#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species sampled
0	% Mayflies (0-100)
0	% Midges & Worms (0-100
0	no units





ЕII Model

Measure Units

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration

**Total Habitat Score** 

- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined) 10. Riparian Width (both combined)

11	no units
15	no units
9	no units
12	no units
16	no units
17	no units
12	no units
8	no units
12	no units
20	no units



132 no units

## Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

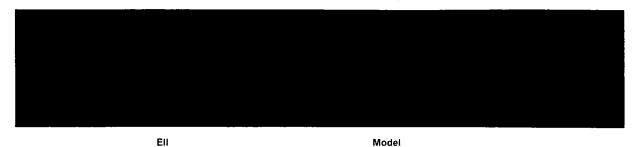
0	# of taxa sampled
0	# of EPT species san

% Mayflies (0-100) % Midges & Worms (0-100)

no units

NΑ





riables Measure Un

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

#### RBP Habitat Parameters

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

14	no units
8	no units
9	no units
11	no units
8	no units
15	no units
16	no units
8	no units
12	no units
20	no units



Total Habitat Score 121 no units

#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled	
0	# of EPT species sampled	
0	% Mayflies (0-100)	
0	% Midges & Worms (0-100)	

\_\_\_\_\_no units

105





Ell Model

The second of the s

Variables

Measure Units

Enter quantitative or categorical measure from Field Data Sheet in shaded cells

## **RBP Habitat Parameters**

- 1. Epifaunal Substrate
- 2. Embeddedness
- 3. Velocity/Depth Regime
- 4. Sediment Deposition
- 5. Channel Flow Status
- 6. Channel Alteration
- 7. Freq. Of Riffles (bends)
- 8. Bank stability (both combined)
- 9. Veg. Protection (both combined)
- 10. Riparian Width (both combined)

17	no units
11	no units
10	no units
6	no units
1	no units
15	no units
16	no units
14	no units
16	no units
20	no units



Total Habitat Score

126 no units

#### Macroinvertebrate Data - Family Level (All Habitats)

- 11. Family Taxa Richness
- 12. Family EPT Richness
- 13. % Ephemeroptera
- 14. % Chironomidae & Oligochaeta
- 15. mFBI

0	# of taxa sampled
0	# of EPT species san

- % Mayflies (0-100)
- 0 % Midges & Worms (0-100)
  - \_\_\_\_no units

NA



## **Intermittent Streams**

# Project ID: Breathitt Co., Item No. 10-270.60 & .70

# Stream/Reach: Reach 2 Intermittent

Loss of Ecological Integrity/running foot due to Project Impacts =	0.16	UNITS EII (0-1)
Impact Length =	524	(ft)
Compensatory Mitigation Ratio =		-
In-Lieu Fee (adjusted to offset cumulative impacts) =		

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07 Stream/Reach: Reach 3B, Perennial Loss of Ecological Integrity/running foot due to Project Impacts = 0.67 Ell (0-1) Impact Length = 391 (ft)

in Lieu Fee (adjusted to offset cumulative impacts) 4 \$117,534.60

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 3C, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.54 Ell (0-1)

Impact Length = 961 (ft)

Compensatory Mitigation Ratio = 154 (ft)

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 3D, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.68 EII (0-1)

Impact Length = 619 (ft)

Compensatory Midnation Ratio = 184 (85.60

## **Ephemeral Streams**

Project ID: Breathitt Co., Item No. 10-270.6 & .7	
<u>Stream/Reach:</u> EPH#2 (Roadway)	

Loss of Ecological Integrity/running foot due to Project Impacts = 0.62	UNITS EII (0-1)
Impact Length = 253	(ft)
Compensatory Mitigation Ratio = 0.81	
In-Lieu Fee (adjusted to offset cumulative impacts) = \$24,591.60	

## **Ephemeral Streams**

# Project ID: Breathitt Co., Item No. 10-270.6 & .7

Stream/Reach: EPH#2 (Fill Site #1)

Loss of Ecological Integrity/running foot due to Project Impacts =	0.62	UNITS EII (0-1)
Impact Length =	755	(ft)
Compensatory Mitigation Ratio =	0.81	
In-Lieu Fee (adjusted to offset cumulative impacts) =	\$73,386.00	

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 7A, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.49 UNITS

Ell (0-1)

Impact Length = 477 (ft)

Companisatory Mitigation Ratio

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 7B, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.56 EII (0-1)

Impact Length = 666 (ft)

Compensatory Militarion Ratio = In Lieu Fee (adjusted to offset cumulative impacts) = 10.56

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 7C, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.49 UNITS
EII (0-1)

Impact Length = 760 (ft)

Compensatory Mitigation Ratio = In-Lieu Fee (adjusted to offset cumulative impacts) = 300.00

#### Perennial Streams

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach:
Reach 8A, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.55 EII (0-1)

Impact Length = 1262 (ft)

Compensatory Midgation Ratio = 1262 (ft)

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

Stream/Reach: Reach 8B, Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.71 Ell (0-1)

Impact Length = 1790 (ft)

Compensatory Mitigation Ratio

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.6 & .7

# Stream/Reach: Reach 8C (Fill), Perennial

Loss of Ecological Integrity/running foot due to Project Impacts = 0.66 EII (0-1)

Impact Length = 649 (ft)

Compensatory Mitigation Ratio = 2.49

In-Lieu Fee (adjusted to offset cumulative impacts) = \$193,921.20

## **Perennial Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

# Stream/Reach: Reach 8C (Roadway), Perennial

## **Intermittent Streams**

# Project ID: Breathitt Co., Item No. 10-270.06 & .07

## Stream/Reach: Reach 8D, Intermittent

		UNITS
Loss of Ecological Integrity/running foot due to Project Impacts =	0.68	EII (0-1)
Impact Length =	1410	(ft)
Compensatory Mitigation Ratio =		-
in-Lieu Fee (adjusted to offset cumulative impacts) =		